Moving from the margins: *migration decisions amidst climate- and environment-related hazards in Bangladesh*

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Abstract

Moving from the margins: migration decisions amidst climate- and environment-related hazards in Bangladesh

Bangladesh is a country at the heart of debates about climate change and migration. This thesis probes to what extent climate- and environment-related hazards influence decisions of villagers in Bangladesh to stay or move out of their place. It considers their experiences of hazards such as cyclones, droughts and floods as proxies of what might happen in the future as a result of changing climate; and probes how they respond when their livelihoods are affected by these stresses and shocks.

The qualitative analysis in this thesis shows that villagers from three hazard-prone districts of Bangladesh –Nawabganj, Munshiganj and Satkhira – often migrate for better livelihoods. However, they usually do not associate their movement to the hazards. At the same time, the quantitative analysis shows that experiences of drought and cyclone positively influence migration outside the district. Though riverbank erosion and flood negatively influence long-distance migration, people affected by erosion tend to move locally. Logit models suggest that though migration is largely driven by poverty and income needs, the poorest, especially those without any assets, are often unable to migrate outside the district. Meanwhile social networks and education contribute to migration.

Whether people state it or not, migration can be a strategy that helps them offset losses and prepare better for future stresses and shocks. However, whether such migration leads to adaptation to climate change depends on the policy environment in the country. A textual analysis of policy documents, however, shows that though urban migration is inevitable for Bangladesh's economic growth, its role as a climate change adaptation strategy is often not acknowledged. The thesis argues that policies need to be more proactive so that migration does not become maladaptive or people unable to move out are trapped in places exposed to climate- and environment-related hazards.

1.

Introduction

Tracing linkages between climate, environment and migration

> "Climate change is projected to increase the displacement of people throughout this century. The risk of displacement increases when populations who lack the resources to migrate experience higher exposure to extreme weather events, in both rural and urban areas, particularly in low-income developing countries. Changes in migration patterns can be responses to both extreme weather events and longer-term climate variability and change, and migration can also be an effective adaptation strategy."
> (IPCC 2014: p.73)

The above statement from the latest synthesis report of the Intergovernmental Panel on Climate Change (IPCC) sums up the context of this thesis. The thesis explores how people in villages of Bangladesh make decisions to stay or move out of their place when faced with changes in their climate and environment. While climate comprises weather conditions prevailing in an area over a long period, environment encompasses the surroundings and conditions in which a community lives and earns a livelihood. Climate and environment are interconnected and closely interact with human systems. The literature suggests that globally human-induced impacts on the composition of the atmosphere, climate, water and land resources and biodiversity are occurring so rapidly that natural systems are often unable to adapt to these changes (UNEP 2003). These changes – often broadly termed as global environmental change – in climate and environment can affect livelihoods, food security, habitats, health and well-being (UNEP 2003).

1.1. Linking climate, environment and migration

To continue living as a viable social group in the face of changes in their local climate and environment, people may have to adjust, adapt and rebuild (Oliver-Smith 2009) or move out to a different place for a short or long period (McLeman and Smit 2006, Tacoli 2009, Barnett and Webber 2010). Global environmental change enhances disaster and impoverishment risks, and it is expected to almost certainly alter human migration patterns in the coming century (Warner et al. 2010). However, large-scale migration is not necessarily the consequence of environmental change; there are multiple drivers behind human movements. A new thinking that is gaining currency in this field is that while migration continues regardless of environmental change, the latter could still influence current and future migration patterns through a range of complex interactions (Foresight 2011). Even when climatic and environmental factors drive migration, a large part of such migration will be in the Global South, within countries or to nearby countries, including to areas of environmental risk (Foresight 2011). In such scenarios, preventing or restricting migration could be risky in the sense that immobility could further impoverish people or lead to displacement and irregular migration in future (Foresight 2011, IPCC 2014). This is one key concern that this thesis addresses.

As such, there is considerable local and global concern about climate change – a large component of global environmental change – and climate variability and their impacts on mobility. Different countries across the world are considered vulnerable to natural hazards and climate variability. "Climate change refers to any change in climate over time, whether due to natural variability or as a result of human activity. Climate variability refers to variations in the mean state and other statistics (such as standard deviations, statistics of extremes, etc.) of the climate on all temporal and spatial scales beyond that of individual weather events. Variability may be due to natural internal processes within the climate system (internal variabil-

ity), or variations in natural or anthropogenic external forcing (external variability)" (IPCC 2007a). Recent research has highlighted different mobility outcomes and their implications under various climate change scenarios (IPCC 2014). At the same time, climate variability also needs attention, as often the potential damage from existing climate variability could be many times more than that of project impact of climate change in the case of countries such as Bangladesh (Adams et al. 2011).

1.2 Focus on a climate change hotspot

Perhaps nowhere is links between climatic and environmental factors and mobility pronounced more than in Bangladesh, a country that sits at the heart of debates about the consequences of climate change. The country is considered vulnerable to extreme weather events and weather uncertainties due to its geographic, socio-economic and demographic features. It has been facing gradual onset climate stresses and sudden shocks, including water shortage, cyclone, floods and coastal/ riverbank erosion (Adams et al. 2011a). It is not only climate extremes that matter, even non-extreme events in a background of social vulnerabilities and exposure to risks threaten people's lives and livelihoods (IPCC 2012). Overall, the country is considered a climate change hotspot (Huq 2001; Huq and Ayers 2008). Hotspots denote regions that are particularly vulnerable to the impact of climate change now or in future with considerable risk to human security (Sherbinin 2014).

During 1994-2013, Bangladesh was ranked six among countries most affected by extreme weather events (Kreft at al, 2015). Hazards such as flood, cyclone and drought often made worse by climate change (IPCC 2011, Haq, 2001, Huq and Ayers, 2008) also influence existing migration patterns in Bangladesh (Poncelet 2010; Gray and Mueller 2012; Black et al. 2013; Penning-Rowsell et al. 2013). However, a large share of migration is driven by high levels of rural poverty in the context of rapid urban growth (Muzzini and Aparicio 2013,

Marshall and Rahman 2013) and high population density (BBS 2011). Such dimensions of environment-climate-migration nexus require a closer look.

However, these multiple dimensions were often overlooked in some of the earlier literature that links climate change with migration. On reason for such a narrow view was that apocalyptic projections of climate change amidst scarcity of natural resources in a growing world have often led researchers to propose staggering figures of migration directly driven by climatic and environmental factors (Tickell 1989; Homer-Dixon and Percival 1996; Myers 2002). Later research, however, has questioned the empirical evidence base behind such figures and debated the approach that produced them (McGregor 1993, Black 2001, Castles 2002, Gemenne 2011; Jakobeit and Methmann 2012). A more nuanced view sees migration as a survival strategy (McGregor 1993) with a broad spectrum of causes and consequences (Black, 2001), influenced by a set of socio-economic and political factors. This thesis acknowledges such a complex relationship, specifically the influence of climate and environment-related factors in migration decision-making.

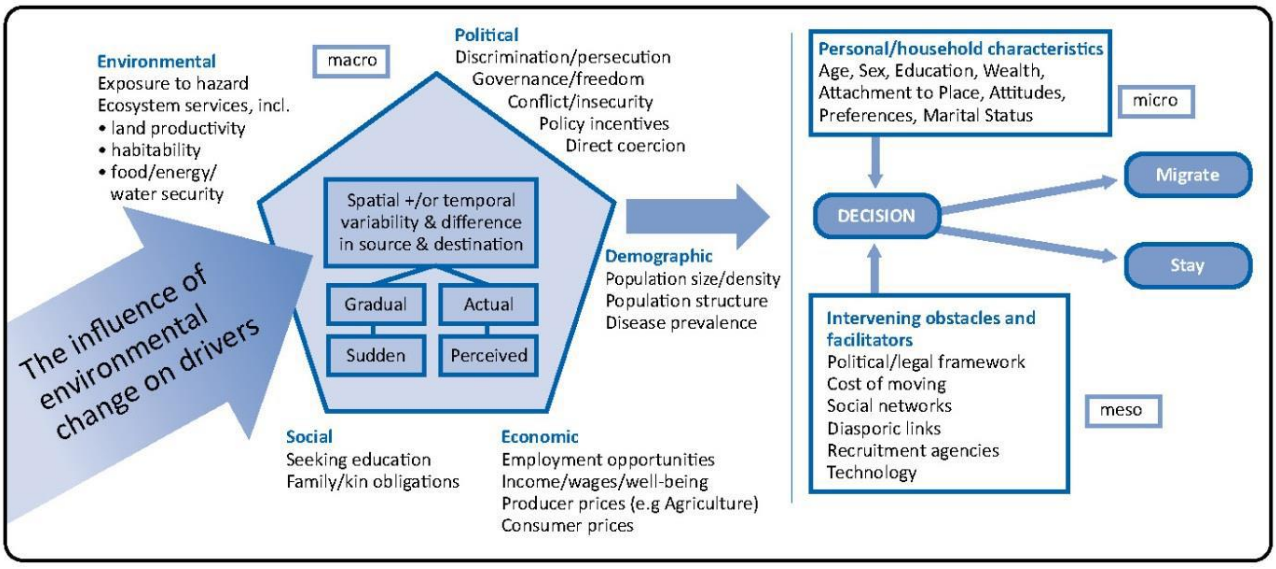
Though this work of research acknowledges the context of climate change in Bangladesh, it desists from using the terms 'climate change migration' or 'climate-induced migration' and coins a more neutral and inclusive phrase, 'climate- and environment-related migration'. The reasons for avoiding a strong association of migration to climate change have been explained in detail in chapter 2 that comprises the literature review. The phrase climate and environment-related migration denotes migration in the context of climatic and environmental stresses, shocks and changes, possibly influenced by them to some degree positively or negatively, directly or indirectly, but not necessarily induced by these factors.

1.3 Concepts, aims and objectives

1.3.1 Climate- and environment-related migration

As this thesis looks at climate- and environment-related migration in a context of a country facing the impacts of climate change, it adopts the conceptual approach outlined in the Foresight (2011) report. According to this approach environmental change affects drivers of migration spread across social, political, economic, environmental and demographic spheres (as shown in figure 1) in different degrees. These drivers may or may not lead to migration, depending on how a set of enabling and limiting factors influence the decision-making regarding movements. The merit of this approach in relation to the thesis is that it puts together different external and internal influences of migration in a comprehensive framework. Therefore, it aids not only testing the sensitivity of migration to climatic and environmental factors but also tests whether other elements influence migration decision-making.

Figure 1.1: ***The conceptual framework used in the Foresight (2011) report on migration***



Environmental change influences multiple drivers of migration decision-making. It is likely to restrict migration as it is to cause migration

A weakness of the Foresight framework (figure 1.1), however, is that it does not take into account personal experiences of hazards and perceptions of risk that mediate migration decisions (analysed in Kniveton et al. 2011, for instance). While considering the sensitivity of existing drivers of migration to climate and intervening factors, this thesis considers how experiences and perceptions influence people's decisions to move out of their place or stay put there. It acknowledges that migration decisions depend on a series of intervening factors and personal and household characteristics (Black et al 2011a) that work at different levels – from personal and household levels to regional and structural (Schmidt-Verkerk 2011). In a context of changes and variability in climate and environment, especially in Bangladesh, this research looks closely at the decision-making process on the right side of the diagram; and how these decisions were influenced by experiences of hazards and their impacts shown on the left corner of the pentagon. These two points have been taken into account to understand how people's experience of hazards and the perceptions of the risk they pose influence migration decision-making process.

On another plane, the thesis counters the assumption of some of the earlier research on migration associated with climate change that assumed that stresses and shocks translate directly into migration (for instance Tickell 1989, Homer-Dixon and Percival 1996, Myers 2002). The thesis probes how movement influenced by climatic and environmental reasons happens in a general context of mobility, and to what extent income and livelihood imperatives also determine migration. The literature shows that people migrate for a variety of reasons that include better income, reduced risks, offsetting market losses and more work opportunities (Stark and Levhari 1982, Stark 1984; Stark and Bloom 1985, Massey et al. 1993). Still, exposure to environmental hazards and disasters may recast a place with a negative image and influence people's relocation decisions (Hunter 2005). Still these movements could mean

forced migration in the immediate aftermath of a disaster, or because of a need for better livelihoods and income necessitated by challenges that their local climate and environment pose.

1.3.2 Migration decision-making

This research follows up on recent enquiries into this process of migration decision-making. The literature shows that migration decisions are mediated primarily through individual agency though it is part of a household-level decision-making process supported by social networks. As Kniveton et al. (2011: S36) put it succinctly, behind each individual decision is a "unique combination of experiences, biases, assets and perceptions". These unique experiences explain the heterogeneity of migration decisions. Theoretically speaking, an individual migrant's intentions and behaviour are shaped by his or her attitude and a set of beliefs and perceptions (Ajzen, 1991) as well as a thought process that includes 'risk appraisal' and 'adaptation appraisal' (Grothmann and Patt, 2005). These concepts are described in detail as part of the methodology in chapter 5.

1.3.3 Aims and objectives

The thesis traces the influence of local climate and environment-related hazards on migration of villagers in Bangladesh. As a corollary, it explores questions regarding various climate and environment-related stresses and shocks; changes and uncertainties in climate and environment and the risks involved; people's acknowledgement of these factors; statistical relationship of these factors with long-term migratory movements; and the policy environment that deals with climate-related migration.

Overall, the thesis aims to understand the influence of climate- and environment-related hazards on migration from villages in Bangladesh. Its objectives include answering a set of corollary questions regarding different dimensions of climate- and environment-related migration. They include:

i) Various climatic and environmental stresses and shocks in rural Bangladesh

ii) People's experiences of changes and uncertainties in climate and environment; and their perceptions of risk.

iii) People's acknowledgement of the influence of hazard experiences and risk concerns in their migration decisions.

iv) Statistical relationship of climate and environment-related hazards with long-term migratory movements.

v) Policy-level acknowledgement of the role of environment and climate-related migration as a climate change adaptation.

These research questions have been discussed in detail in Chapter 4.

1.4 Data gathering

The data for the research largely came from a climate-related migration project of the Sussex Centre for Migration Research at the University of Sussex and the Refugee and Migratory Movements Research Unit (RMMRU) at the University of Dhaka, supported by CDKN (CDKN 2011). This doctoral candidate has worked as the graduate research assistant in the project, contributing to research design, coordination, field interviews, training of field interviewers and data analysis, and as the lead author of a set of publications.

Figure 1.2: ***Map of Bangladesh showing the study areas***

The study districts are spread across three geographic regions with exposure to three major sets of climate- and environment-related hazards and extremes facing Bangladesh – coastal flooding and cyclones (Satkhira); riverbank erosion (Munshiganj) and drought (Nawabganj).

The research has covered areas perceived to be climate change hotspots in recent literature spread out in three districts. They are flood plains and riverine villages in Srinagar, Sirajdikhan and Lohajob sub-districts of the central Munshiganj district; drought-prone villages in Nachole, Shibganj and Nawabganj sub-districts of Nawabganj in the northwest; and cyclone and flood-affected places in Shyamnagar sub-district of Satkhira in the southwestern coastal zone (Rahman et al. 2007, Walsham 2010, World Bank 2010).

As for data collection, secondary data has been used to identify key climate and environment-related characteristics as well as broad migration patterns of Bangladesh. Primary data includes village-level focus groups, interviews and qualitative and quantitative surveys, policy documents as well as rainfall data from meteorological observatories and flood and cyclone data compiled from government reports. The qualitative field data considers how individuals and households make migration decisions based on a number of factors that include livelihood challenges, economic needs, experience of climate-and environment-related hazards and the perceptions of risks they pose. It also looks at the socio-cognitive variables that influence migration decisions. Questions focus largely on perception and assessment of environmental risks, and barriers and facilitating factors of migration. It explores the decision-making process and to what extent migration is an effective adaptation strategy. Meanwhile policy documents – in the fields of migration, climate change, development and disaster risk reduction – provides the basis for a textual analysis of government attitudes to climate and environment related migration, and identification of enabling and disabling factors for prospective migrants. The quantitative data covers questions on migration, employment, assets base, demographics, community-level and environmental data. This analysis considers the combined effect of different socio-economic as well as climatic and environmental determinants of migration in response to climatic stresses and shocks. The analysis also reveals the

characteristics of those most likely to migrate in the face of climate-related threats and environmental change.

1.5 Contribution

The contribution of this thesis lies in three areas of research into climate- and environment-related migration. First, it gathers empirical evidence for linking migration decisions with climatic and environmental factors using qualitative and quantitative methods. Second, it looks closely at the migration decision-making process itself. Third, it considers migration as a climate change adaptation strategy and looks at the policy implications of such a viewpoint.

Theoretically, the thesis aims to frame environmental change as a phenomenon that influences existing multiple drivers of migration (Black 2011a, Foresight 2011). It traces the roots of such a framing back to existing neoclassical migration theories (for instance, Todaro 1969). However, it identifies its limitations in the context of climate. While the thesis acknowledges the livelihood and economic dimensions of migration, it places the influence of climatic and environmental factors upfront, unlike in studies that take a neoclassical approach. Second, it argues that while migration is driven by poverty and income needs, the poorest, especially those without assets are often unable to make long distance migratory movements. Third, it goes beyond the framing of behavioural factors of migration (for instance, Wolpert 1965; De Jong and Fawcett 1981), by incorporating elements of cognitive enquiry (Grothmann and Patt 2005; Kuruppu 2009; Kniveton et al. 2011, 2012; Reckien et al. 2013).

In terms of practical relevance, the thesis considers different forms of human mobility in a spectrum ranging from displacement to planned urban migration for economic gain. It con-

siders how people view migration as a strategy for more remunerative livelihoods and as a way to offset losses suffered in disasters, and to be prepared for future stresses and shocks. The argument here is that as people view it as a positive step, such migration could be seen as contributing to adaptation in the context of climate change. Therefore, it argues for a policy realignment that acknowledges the adaptive role of migration. While displacement is often inevitable, policies could help people avoid it by aiding alternatives such as local adaptation, migration and, to a limited extent, planned relocation.

Rather than proving or disproving the how climatic and environmental drivers cause migration, this thesis attempts to assess the sensitivity of existing drivers and intervening factors affecting migration to climate change. It focuses on existing migration trends in Bangladesh and considers their climate- and environment-related influences. To a limited extent, it uses an integrated assessment approach looking at climate impacts and vulnerability assessment and policy analysis (Black et al. 2011b). It represents interactions across different spatial and temporal scales, climatic processes and events such as rainfall variability, droughts and storms and people's livelihood activities. It includes statistical models, qualitative field research and text analysis of policies. While a mix of qualitative and quantitative approaches helps to triangulate the findings, the thesis offers new insights into climate-environment-migration nexus.

1.6 Limits

This thesis does not attempt to study long-term climatological patterns and their possible impacts on people's mobility patterns. Rather, the focus is on climate and environment-related hazards over the recent past, based on retrospective data that goes back around two decades on average. Second, its inferences are largely based on surveys using both quantitative and qualitative methods. It mainly depends on how individuals report changes in their environ-

ment and climate and how they affect their livelihoods and influence their mobility. Information about the household dynamics of decision-making has been elicited from these individual interviews –a more rigorous approach involving more family members in follow up discussions would have given more detailed picture of household-level decision-making.

Further, the use of instrument data has been limited to rainfall measurement, as well as country-level data on cyclone and floods. A more spatially disaggregated data based on instrument observation would have contributed to a more rigorous analysis – but that was beyond the scope of the research project. No attempt has been made to discern long-term trends that could be proven as climate change—we have clustered year-to-year variability in hazards and longer-term trends to understand their impact on migration decisions. These observations may not be considered as proof for climate change impact or otherwise. Last, but not the least, more in-depth field enquiries on these influences and linkages would have helped in triangulating the findings. However, follow up field visits had to be ruled out in view of political troubles and violence in Bangladesh in 2013, during the last phase of the project period (FCO 2014).

1.7 Structure

After this introduction, chapter 2 provides a comprehensive literature review to place the thesis in the context of research broadly in the field of climate and environment-related migration. This chapter first looks at the evolution of the concept of the environment-climate-migration, reviews migration theories, and connects the thesis to the literature in behavioural sciences, cognitive analysis, and adaptation; then it reviews empirical studies in the field. Chapter 3 is a case study of Bangladesh that describes the country's hazard exposure, migration patterns and drivers. Chapter 4 discusses the questions. Chapter 5 describes the theoretical approach broadly in three areas – climate and environment-related migration, study of

migration decision-making and policy analysis and the methods used in each step of the research.

The following three empirical chapters (6–8) respectively adopt a qualitative, quantitative and policy analytical approach to answer the core research questions outlined above. Chapter 6 uses qualitative analysis approach to understand how experience of changes and uncertainties and risk perceptions influence people's migration decisions. The following chapter 7 uses quantitative analysis to probe how experience of climate and environment-related hazards relate with long-term migration. Chapter 8 takes a close look at the climate change, migration, development and disaster risk reduction policies of Bangladesh, and examines to what extent they acknowledge migration as a climate change adaptation measure. Finally, chapter 9 synthesises the findings, and concludes the thesis.

2.

Literature review

Examining the climate- and environment-related migration

The literature on climate, environment and migration linkages has often been marked by neo-Malthusian overtones, linking climate change with resource shortages, leading to forced migration and often violence (for instance, Myers and Kent 1995, Homer-Dixon and Percival 1996). While concerns over the potentially devastating human impacts of climate change and the ensuing forced migration and its socio-political and economic implications still remain alive, many researchers are critical of this notion, and have sought instead to trace the multiple, complex ways in which social and ecological systems interface. Asserting that there would likely be an increase in migratory movements in the coming years with or without climate change (Foresight 2011), newer literature also gives an indication of the uncertainties of future migration patterns in terms of their scope in time and space.

At the same time, the rhetoric of climate change leading to more migration of largely poor people and, in turn, resource scarcities triggering conflicts is also alive in academic and policy circles (for instance, Reuveny 2007; 2008). Some newer publications have recycled old figures without much empirical evidence or even revision as Gemenne (2011) and Jakobeit and Methmann (2012) report. That is the context for this chapter of literature review. It focuses on recent research in the field of climate and environment-related migration, tracing how the debate over this issue has led to new research, methods and evidence. Though much of the research on human impacts of climate change discussed here is rooted in human geography, the chapter also draws from social anthropology, sociology, climate science and ecology. The migration decision-making aspects discussed as part of the qualitative analysis are

influenced by behavioural economics and social psychology. In this regard, research on migration and environmental change is becoming increasingly interdisciplinary, adding new dimensions to the field of migration studies.

An interdisciplinary approach helps this thesis take a close look at the multi-causal nature of migration in Bangladesh amid climatic and environmental stresses and shocks; and how people make decisions on staying or moving out of their place for short or long durations to nearby or faraway destinations. Setting the academic context for such an enquiry, this chapter first narrates how the concept of the environment-climate-migration nexus has evolved, mainly over the past three decades. Then it moves on to explore theories of migration that take a behavioural approach to understand various facets of human mobility, including in the realm of climate and environment. As a next step, the chapter briefly explains how migration could contribute to adaptation and resilience, two concepts gaining currency of late in the UN, humanitarian and development interventions, especially in the context of climate change. Then the chapter reviews recent literature, including synthesis studies that present evidence for climate and environment-related migration and its policy implications. The broad range of literature considered in this chapter sets the scene for the following chapter 3, a case study of Bangladesh that looks more closely at country-specific evidence.

2.1 Environment-climate-migration nexus: the debate

2.1.1 The multi-causal nature of migration

Historically environmental and climatic factors have often been cited as influencing human mobility patterns. Indeed, environmental and climatic dimensions of migration gained research attention as far as a century ago. Ravenstein (1889: 286), for instance, wrote about "unattractive climate...producing currents of migration". However, while changes in the environment give rise to livelihood pressures and safety concerns, people's aspirations for a better

life also contribute to their migration decisions. One example for such mixed motives of migration that has gained research attention is the 1930s Dust Bowl phenomenon in the US. As a case illustrating the multi-causal nature of migration, The Dust Bowl offers many lessons. Narratives (for instance McWillams 1942, Johnson 1947), historical analyses (Worster 1979, 1986), and photo documentation (FSA) have vividly captured different dimensions of climate-environment-human interface involved in this dramatic episode in the history of the US.

As the above accounts show, Dust Bowl was a cumulative effect of environmental and economic crises (Obokata et al. 2014) leading to migration of three million people (Boano et al 2007). This migration included rural-to-urban, urban-to-rural, and rural–rural movements (McLeman et al. 2014). Researchers have approached this event from different angles. One viewpoint is that settlers who came in the late nineteenth and early twentieth centuries converted large swaths of grasslands into grain, corn, and, cotton farms. The prevailing economic ethos promoted over-exploitation of nature for profit, with farmers underestimating the risk of drought (Johnson 1947, Worster 1979). According to this perspective, converting grassland to wheat, combined with the great drought of 1930s led to massive dust storms and mass migration. This argument has influenced later analyses of socio-economic processes and hazard risk profile (for instance, Blaikie et al 1994, Oliver-Smith 1996). Oliver-Smith (2013), for instance, draws parallels between the 1927 great flood of Mississippi that displaced 700,000 people (including 330,000 African Americans), Dust Bowl migration to California, and Hurricane Katrina of 2005. In these cases, flood, drought and hurricane, respectively, worsened the prevailing socio-economic conditions and labour practices triggering mass migrations.

However, later studies using newer tools – including economic datasets and maps – have provided new insights into the Dust Bowl phenomenon. Some of the studies questioned the notion that it was an ecological failure led by profit maximisation. Cunfer (2005), for in-

stance, countered the notion of over-farming, showing that the balance between cropland-pasture remained virtually stable form 1920s until the 1990s. More recent studies – especially in the wake of 2005 Katrina and 2008 financial crisis leading to migration – have given newer insights into relationship between environment and population movements. One such finding is that it was not necessarily settled farmers who migrated after all. The farmers were learning to adjust and adapt to local conditions, and more experienced among them took care of the land; while later arrivals often engaged in badly maintained monoculture grain farms, from where dry soil drifted across, making more farms barren (McLeman et al 2013).

Another interpretation is that more public spending as work relief, public works, direct relief and social aid reduced migration from the areas that were benefitted; but attracted migration from elsewhere (Fishback et al. 2006). Therefore, the argument is that migration during the 1930s was lesser than during the decades before and after; and had the New Deal spending (to offset the impact of the Great Depression) been more evenly distributed across counties, it would have had still lesser impact on net migration (Fishback et al. 2006). These interpretations of the Dust Bowl phenomenon show the multi-causal nature of environment-related migration and challenges it poses in terms of understanding and responding.

2.1.2 Drummed-up fears of climate migration

Despite such a widely talked about environmental event such as the Dust Bowl, the human-environment interface often remained a mere backdrop rather than a core concern in migration research (Hunter 2005; Piguet 2010) – till a certain point when the situation changed dramatically. As Oliver-Smith (2012) argues, underplaying of the environmental factors in studies related to migration could have been due to dualistic western notions that tend to place nature as something distinct from human beings and their societies. Even though environment was not the key focus of empirical studies, theorists still included environmental fac-

tors as a drivers of movement as explained in section 2.3 of this chapter. Even with a thin empirical base, the concept of environment-migration nexus rather dramatically began to gain currency during the 1970s and 80s. This happened in the background of the growth of the environmental movement, increasing scientific evidence for global warming (Peterson et al 2008), and climate change becoming a global policy concern (National Research Council 1979).

An early example of this period noted: "As human and livestock populations retreat before the expanding desert, these "ecological" refugees create even greater pressure on new fringe areas, exacerbate the process of land degradation" (Brown 1976: 39). Later research projected a grim scenario of forced migrants in their millions putting undue pressure on the environment, in some cases violently competing over resources, in an apocalyptic backdrop of climate change (El-Hinnawi 1985, Jacobson 1988, Tickell 1989, Myers 1993, Myers and Kent 1995, Homer-Dixon and Percival 1996, Myers 2001).

Against a background of population growth in poor countries, environmental events and processes could lead to shortage of resources, conflicts and displacement, as the researchers mentioned above projected. Internal as well as international movement involved a projected 50 million people by 2010 (UNFCCC 2007) to 250 million by 2050 (Christian Aid 2009). Follow up reports were published even in recent years (for instance, Stern 2007, Biermann and Boas 2010, UNCCD 2010). Often they built on or repeated earlier figures, especially the ones used by Myers and Kent (1999) (for instance, Christian Aid 2009, Oxfam 2009). In a review, Jakobeit and Methmann (2012) listed a set of such recent reports (table 2.1). As Gemenne (2011: S41) puts it in an article title, "the numbers don't add up", with critics dubbing them "artificially inflated, excessively alarmist, or 'guesstimates"'.

Table 2.1: ***Various projections of climate migrants and refugees***

Report	Projected year	Projected figure
ChristianAid (2009)*	2050	250 million
Oxfam (2009)*	2050	150 million, 75 million in Asia Pacific
Greenpeace (2008)*	2100	125 million in India- Bangladesh
Tearfund (2006)*	2050	200 million
Myers (2002)*	2050	250 million
Stern (2007)*	2050	150 - 200 million
UNFCCC (2007)	2010	50 million
UNEP (2008)	2010	60 million
GHF (2009)*	2009 2050	26 million + 25 million (indirect) 150 - 200 million
UNU-EHS (2005)	2010	50 million

(Jakobeit and Methmann 2012) * *Refers to Myers and Kent (1995).*

It may be noted that the discourse was not about migration related to climate or environment, but 'environmental migration', 'environmental refugees' (El-Hinnawi 1985, Myers 2005), 'climate refugees' (Bierman and Boas 2010) or 'environmental exodus' (Myers and Kent 1995). The first UN intergovernmental report on climate change, for instance, noted: "The gravest effects of climate change may be those on human migration as millions will be displaced" (IPCC 1990: 20). UNHCR (1993) acknowledged what it called "clear links" between degradation of the environment and refugee movements, asserting that the deterioration of the natural resources in a background of demographic pressure and chronic poverty could trigger or amplify political, ethnic, social and economic tensions. Even though both of these organisations have since taken much more nuanced positions on the subject, many other international bodies, UN organisations and NGOs have repeated these concerns.

2.1.3 Challenging the rhetoric of climate migration

Even while acknowledging that changes in climate and environment could drastically alter human habitats and thereby influence mobility patterns, critics have questioned the projected apocalyptic scenario of climate migration. McGregor (1994: 121), for instance, challenged the notion of "simple and direct cause-and effect link between climate change and migration" and argued that the idea of environmental push factors was inadequate to explain migration. Instead, people's entitlements (Sen 1981), access to resources, the role of social institutions, labour relations, culture, social networks and human agency together determine their differential vulnerability to environmental adversities and migration decisions (McGregor 1993).

In a comprehensive critique, Black (1998) challenged the rhetoric of environmental migration citing case studies from Africa, Asia and Latin America. He looked at what appeared to be a straightforward relationship between environmental degradation and forced migration and found a lack of convincing evidence to link the two phenomena. A closer look at cases of environmental degradation often cited as a cause of migratory or refugee movements, especially in Africa, revealed that they were not necessarily related to people's movements. This finding prompted the framing of migration as an essential part of socio-economic processes rather than an outcome of environmental decline. Based on these findings, Black (1998: 182) suggested that researchers look for "spatial and temporal relationships between periods of forced migration and environmental decline" and gather better evidence for climate change-related phenomena such as sea level rise. Echoing similar concerns in a review article, Lonergan (1998) noted that though environmental degradation and resource depletion may contribute to population movements, the linkages were embedded in a matrix of poverty and inequity. Migration attributed to environmental causes was found to be a form of coping mechanism that people have been practicing historically (Black 2001). Later Castles (2002) commented that environmental factors are always closely linked to political and economic fac-

tors, including globalisation, and exclusion of whole regions from global development, leading to decline in living standards.

Clearly, a divide between those forecasting waves of 'environmental refugees' and those adopting a more sceptical stance became evident by the 1990s. Recognising such a sharp divide, Dun and Gemenne (2008: 10) call researchers who isolate environmental and climatic factors as the main driving forces of migration "alarmists", and those who stress on the complexity of the migration process as "sceptics". The sceptics challenged the "maximalist" (Suhrke 1994: 4) figures and the simplistic models derived from "common sense" (Perch-Nielsen et al 2008: 375) behind these projections of mass migration. Critics also challenged the empirical evidence, alarmist tone and the stress on environmental change as the sole or main reason for large-scale human movements (McGregor 1993, Black 2001, Castles 2002). They spotted considerable data problems in studies linking demographic processes with rural environment in development countries, and demanded more rigorous research (Bilsborrow 1992, Suhrke 1994, Hugo 1996, Bates 2002). One suggestion put forward by several of these critics is to take into account social, economic, and political factors while looking at environment-related migration.

A new academic consensus was beginning to emerge by the 1990s, acknowledging that environmental factors cannot be studied in isolation to understand peoples' movements. At the same time, different concepts in the environment-migration discourse became targets of criticism. In this regard one contentious issue that still sparks debates is the term 'environmental refugees', defined as people forced to leave their habitat, because of a marked environmental disruption, including human-made changes (El-Hinnawi 1985). Scholars rejected the term on political, legal and ethical grounds (Kibreab 1997, Black 2001, Castles 2002; Renaud et al. 2011). Reviewing literature on 'environmental refugees' Black (2001) argued that concern

about poor people leaving fragile environments has not translated into hard evidence for what causes their movements, or any real theoretical or empirical insight. Several streams in the continuing research in the field of climate, environment and migration take forward this quest for evidence as section 2.5 of this chapter shows.

As the literature discussed above shows, a combination of harsh or deteriorating environmental and living conditions have historically driven migration (Black 2001). While sudden shocks might involve distress migration or displacement at a local level, changes over long periods also change people's lifestyles and livelihoods in specific geographies (McLeman 2014). Response to rising vulnerability involves a layered and complex social system across different scales of time and space, and permanent relocation is typically a least-favoured, last-resort option (McLeman 2014). In this context, the very logic of attributing a monocausal relationship between climate change and migration in research as well as policymaking could be problematic (Nicholson 2014). Instead, as recent studies show, human movements can be seen as multi-causal processes with economic, social, political and cultural dimensions (Hugo 2008, Perch-Nielsen et al 2008, Barnett and Webber 2010, Black et al 2011a)

2.2 Migration as a behavioural response to changes in the environment

Even as migration involves multiple drivers, people's decisions to stay or leave are influenced by a huge range of factors (Black 2001). Migration theories have sought to understand why people leave or stay by studying the behavioural and other factors involved in migration. This section first traces how different strands to theory view migration, and how what role they ascribe to climate and environment as an influential factor in migration decision-making.

2.2.1 Migration as a part of the modernisation process

Migration theories can be classified into two broad paradigms – functionalist and historical-structuralist (de Haas 2010). Functionalist theories consider migration as something that benefits the society in general by reducing inequalities within it and in relation to other societies (Castles et al 2014). The notion that income and other opportunity differentials drive migration from low to high-income areas has been a dominant theme in migration studies historically (for instance, Ravenstein 1889). This notion of equilibrium has given rise to what can be termed 'push-pull' models that consider various economic, environmental, and demographic factors that push migrants out of their places of origin and attract them into new destinations (de Haas 2010). A step further, neo-classical migration theories (for instance, Todaro 1969, Harris and Todaro 1970) give a more sophisticated explanation for rural-urban migration, framing migration as an individual choice driven by a desire to maximise income (Massey 1993). Based on neoclassical economics that considers wage differentials and other employment benefits across different work settings, this theory recognises inequalities of income across space. Individuals leverage from geographical differences in the supply and demand for labour by migrating to places that has a shortage of labour force and/ or better income prospects (de Haas 2007). Migration is framed as a result of spatial differences in the relative scarcity of labour and capital, with migration decisions made by agents, or rational actors. Thus, migration becomes an essential part of the modernisation process with urban-centred economic activities encouraging more and more people to move from villages to cities in search of better income (Todaro 1976, Skeldon 1997).

According to the neo-classical theory, migration optimises the allocation of production factors leading to better efficiency and equilibrium. While this thesis acknowledges the economic aspect of migration as spelt out in the neoclassical approach, it tests the limits of the framework by exploring the extent to which interrelated environmental and economic factors

drive and sometimes prevent migration. Even when there is a clear need and opportunity to gain better income by migrating, often people are unable or unwilling to migrate, as this thesis argues, and such limits and decisions are often linked to environmental and climatic factors. Besides, this thesis considers the finer cognitive elements of migration decision-making.

On another plane, the notion that migration involves free choice itself has been debated. Historical structuralists, for instance, have argued that such a free individual choice does not exist as structural forces limit people's options; therefore, people have to migrate when global forces change their political economy (de Haas 2007). Rooted in neo-Marxist economic theory, historic-structuralists take into account socio-economic, political and cultural settings and structures that constrain and influence individual behaviour. People are often forced move when traditional economic structures are undermined, as they become part of the global political-economic system (Castles et al 2014). Global inequalities in income, political freedom and quality of life influence migration, and it an intrinsic part of development, globalisation and social transformation. (Castles et al 2014). In this framing, migration is more of a patterned phenomenon, with market forces, social stratification, and structural inequalities restricting people's choices. Migration, therefore, is often explained as an outcome of disruptions caused in the process of capitalist accumulation, a manifestation of capitalist expansion with its inherent inequalities (Massey et al. 1998). As opposed to neoclassical theories, this theory sees migration as a process that further deepens inequalities across regions and within the society.

This thesis does not take an explicitly historical-structuralist approach. However, it questions the notion of free choice involved in migration. It argues that often poor people are often unable to move out of hazard-prone places because of lack of resources, or exposure some haz-

ards such as riverbank erosion and frequent floods further impoverish them and limit their ability to migrate.

While it is impractical to adopt a 'grand theory' that encompasses all aspects and types of migration (Castles 2014) various facets of migration have been explained by newer theories of migration. The thesis draws from some of these theoretical contributions. Many assumptions of the neoclassical theory, such as individual agency, have been critiqued in the New Economics of Labour Migration (NELM) theory (Stark and Bloom, 1985, Stark 1991, Taylor 1999). NELM acknowledges that migration decisions are not made by individuals acting alone, but by groups of related people, especially families and households, in an effort not only to maximise income, but also to minimise risks and offset the impacts of losses.

In an NELM framing, migrants do not act alone, but institutions such as families influence them to maximise expected income, minimise risks, offset market losses and leverage labour opportunities (Stark and Levhari 1982, Stark 1984, Stark and Bloom 1985, Massey et al. 1993). It could be a household-level decision to improve income by sending one or more members to a different place or shift residence altogether, an effort to gain social mobility, or a search for a better and safer place to live. In these cases, the decision-making process is determined by expectations of rewards in a new location (De Jong and Fawcett 1981). This involves diversification of resources, including labour by different family members. One or more family members may migrate and send remittances to support the others who stay back at home so that even if local economic conditions and livelihoods fail or deteriorate, remittances can act as an insurance and supplement (Massey 1993). Such a framing of sharing and offsetting risks at a household level is especially useful in the case of climate- and environment-related migration. This thesis acknowledges the role of households in migration-decision-making.

2.2.2 The role of the environment and climate in migration decisions

Migration theories based on neoclassical economics have, often, addressed the role that environment plays in migration decision-making, along with other factors such as climate, perception of changes in the environment, as well as socio-economic factors, including networks (for instance, Wolpert 1965; 1966; Brown and Moore 1970). Wolpert's (1966: 93) stress-tolerance model of migration, for instance, defined stress as a set of "noxious" environmental forces and strain as an individual's reaction to it. Stress could influence decisions related to staying or moving, though non-movement is not considered an "equilibrium position". On similar lines, Brown and Moore (1970), for instance, theorised environment as a source of stimuli, some of the stressors that can disrupt or threaten household behaviour patterns.

However, this influence of the environment can have differential impact on individuals based on how each one of them perceives the stress, what they know about alternatives, and the way they respond (Brown and Moore 1970). Wolpert (1965: 161) argued that population movement is an interaction over space but the points of origin and destination attain significance only in the way they are perceived by the active agents. He made the distinction between the objective stimuli and the perceived stimuli to which an individual reacts while making the "mover-stayer decision" based on "bounded rationality". Bounded rationality is a concept advanced by Simon (1996) that suggests the rationality of decision-making is limited by the available information that people have, the cognitive limitations of their minds, and the time available to make the decision. The search and selection of alternatives and the decision to relocate or to adjust to one's current location depends on the information that he or she has about future locations. This information is gathered from the media, friends, relatives and employment agents (Brown and David 1970).

In this context, Wolpert (1965: 161) viewed migration "as a form of individual or group adaptation to perceived changes in environment, a recognition of marginality with respect to a stationary position, and a flow reflecting an appraisal by a potential migrant of his present site as opposed to a number of other potential sites." However, other forms of adaptation such as changed farming practices, for instance, were seen to be more common than change of residence and livelihood activity. The notion of movement as a way of adaptation has become a highlight in recent literature in the field of climate and environment-related migration (for instance, Barnett and Webber 2010). In the context of climate change, adaptation has been defined as an "(a)djustment in natural or human systems in response to actual or expected climatic stimuli or their effects, which moderates harm or exploits beneficial opportunities" (Parry et al 2007: 6). While higher temperatures lead to sea level rise, and extreme weather events and uncertainties subsequently affect natural resources, assets and, in turn, livelihoods, safety and wellbeing of people (McCarthy et al., 2001), adaptation becomes a necessity. The role of migration as a climate change adaptation measure has been discussed in detail in section 2.4.

Among models of migration behaviour at macro and micro levels, an influential contribution is the value-expectancy model (De Jong and Fawcett 1981) that explains individual, household, and societal determinants of migration. In this model, motivation is defined as a function of the value placed on certain goals and the perceived likelihood that a behaviour will lead to those goals. Such goals include comfort, along with wealth, status, and autonomy. Comfort means a pleasant, healthier or less stressful living environment. As follow up work has shown, people respond to environmental pressures by changing behavioural factors as well as social relations (Bilsborrow and Okoth-Ogendo 1992) mediate land-use practices and such responses. While the utilitarian value of place and wage differentials across geographies contribute to the push and pull for migration, the migrants also take into account environmen-

tal factors, expectations of modernisation as well as social considerations in their decision-making process.

Migration may not always be aimed at securing a better job or even comparatively better living conditions, it could be just an escape from temporary disruptions or a strategy to offset a reduction in income back home (Stark and Levhari 1982). Extreme forms of such disruptions, namely disasters, could lead to forced migration. Oliver-Smith (1996: 303) defines a disaster "as a process/event involving the combination of a potentially destructive agent(s) from the natural and/or technological environment and a population in a socially and technologically produced condition of vulnerability." In this framing, disasters are symptomatic of the failure of a society to adapt well with its natural as well as socially-constructed environment (Oliver-Smith 1996). Hurricane Mitch of 1998, for instance, overwhelmed and disrupted social, economic, and environmental processes of Florida (Oliver-Smith 2009). Forced migration from such disasters and environmental crises result from interactions among climatic, environmental and social systems that lead to the catastrophic event, blown up even bigger by the event itself – so focusing on the environmental factors as the main or sole cause of migration is a fallacy, overshadowing socio-political and economic aspects (Black, 1998, 2001, 2011a, Oliver-Smith 2012).

As opposed to viewing climate-related migration as a desperate act of helpless people (as some of the literature cited in section 2.2. shows), the above studies show that at varying degrees, migration involves a decision-making process to make the future better or to escape from a condition that involves risk or losses. A number of factors mediates this process as the literature further shows. These factors include variability in the climate and the environment as well as characteristics of the migrants, at what stage are they in their life cycle, demographic features, as well as socio-economic status (Wolpert 1965). It may be argued that the

framing of environmental change as a phenomenon that influences existing multiple drivers of migration (Black 2011a, Foresight 2011) is a logical follow up of neoclassical migration frameworks made more relevant in the context of current concern about climate change.

Migration decisions are often unique to individuals as further research in this field notes. These decisions depend on a series of intervening factors and personal and household characteristics. These factors work at an individual level, through local networks or at a macro level – which could include the global effects of climate change (Schmidt-Verkerk 2011). Some of the theories of migration acknowledge that individual values and attitudes (Ritchey 1976), feelings and an exercise of independent will or agency (Stark and Bloom 1985) play a role in migration decision-making. The social structure of communities, and individual migrants' characteristics and status within the structure also have an effect on migration (Ritchey 1976). A combined reading of the literature cited above shows that environment and climate-related migration involves multiple causes, influences and individual agency, mediated by social norms, traditions and cultural backgrounds. As Kniveton et al. (2011: S35) put it succinctly, each migration decision is driven by a "unique combination of experiences, biases, assets and perceptions".

2.3 Taking a deeper look into mental processes

Just as migration decisions are unique, the notions of risks that make people take these decisions are also unique. Social and cultural factors determine the way people perceive and accept risks (Slovic 1987). People often misjudge risks and natural hazards. Flood plain dwellers, for instance, have difficulty in assessing the probability of a major flood. Many people tend to think that a major flood might not occur soon after another one. Often they replace the uncertainty of such hazard events by seeing them as cyclical, repetitive occurrences or apply a law of averages that rules out major events one after another (Slovic 2000). Besides, beliefs

and perceptions of risks are related to the way people experience natural hazards and the culture and livelihoods that communities share. Besides, people often choose or feel compelled to live in dangerous places because of livelihood pressures (Cannon et al. 2013). Therefore, to learn how different communities and individuals respond differently to climate and environment-related stimuli, a close look into mental processes that shape perceptions, experiences, and responses of climatic stresses and shocks is needed (Grothmann and Patt 2005). This section deals with literature that offers such a close look.

2.3.1 Towards cognitive analysis

While a behavioural approach in geography tries to understand people's interactions with environment by understanding human behaviour, cognitive research looks more closely at decision-making at an individual level – still explaining its impacts on and influence from multiple hierarchies, i.e., households, communities, districts and so on. Such inquiries build on behavioural approaches, but more closely look at socio-cognitive variables that influence perceptions, beliefs, motivation and their decision-making patterns under uncertainties (Grothmann and Patt 2005). For instance, in Bangladesh, many people find themselves helpless in the face of floods and cyclones they believe to be acts of God (Schmuck, 2000). Such beliefs influence the way they respond to disasters. This thesis goes beyond the behavioural approach in migration research and uses moving into the realm of cognitive analysis to understand people's responses to climatic stimuli (Grothmann and Patt 2005, Kuruppu 2009, Kniveton et al. 2011, 2012, Reckien et al. 2013). This line of research draws from behavioural economics and social psychology (e.g., Ajzen and 1980, Tversky and Kahneman 1991) as Grothmann and Patt (2003) shows.

In this field, the literature has shown that climate risk perception and perceived adaptive capacity – what an individual or a community thinks it can do, given the availability and access to resources – as important as objective adaptive capacity, or what they can actually do (Grothmann and Patt 2005). They are among the determinants of the adaptation decision-making process. Adaptive capacity means the "ability of a system to adjust to climate change (including climate variability and extremes) to moderate potential damages, to take advantage of opportunities, or to cope with the consequences" (IPCC 2007a).

In migration studies, De Jong et al. (1986) support the Ajzen and Fishbein (1980) theory of reasoned action to a large extent. They have included among explanatory variables, migration intentions, behaviour, family pressure – to move or stay – family networks at alternative destinations, resources to move, prior migration experience, and the life cycle stage, including marital status and age. Personal and structural backgrounds were shown to have an independent and direct effect on migration behaviour. By extending this theory to incorporate the additional parameter of perceived behavioural control, Ajzen (1991) created the theory of planned behaviour. Intended to aid prediction of behaviours over which a person does not have complete voluntary control, perceived behavioural control is conceptualised as the expected ease of actually performing the intended behaviour.

Including attitudes towards a behaviour, a subjective norm and perceived behavioural control (as well as the beliefs held by an individual that make up these components), the theory of planned behaviour can be used to effectively break down the reasoning process relating to the development of a behavioural intention making migration decisions. Thus, within the theory of planned behaviour, the intention to perform a behaviour is considered a direct antecedent of the behaviour. Attitudes are thought to represent an evaluation of the perceived conse-

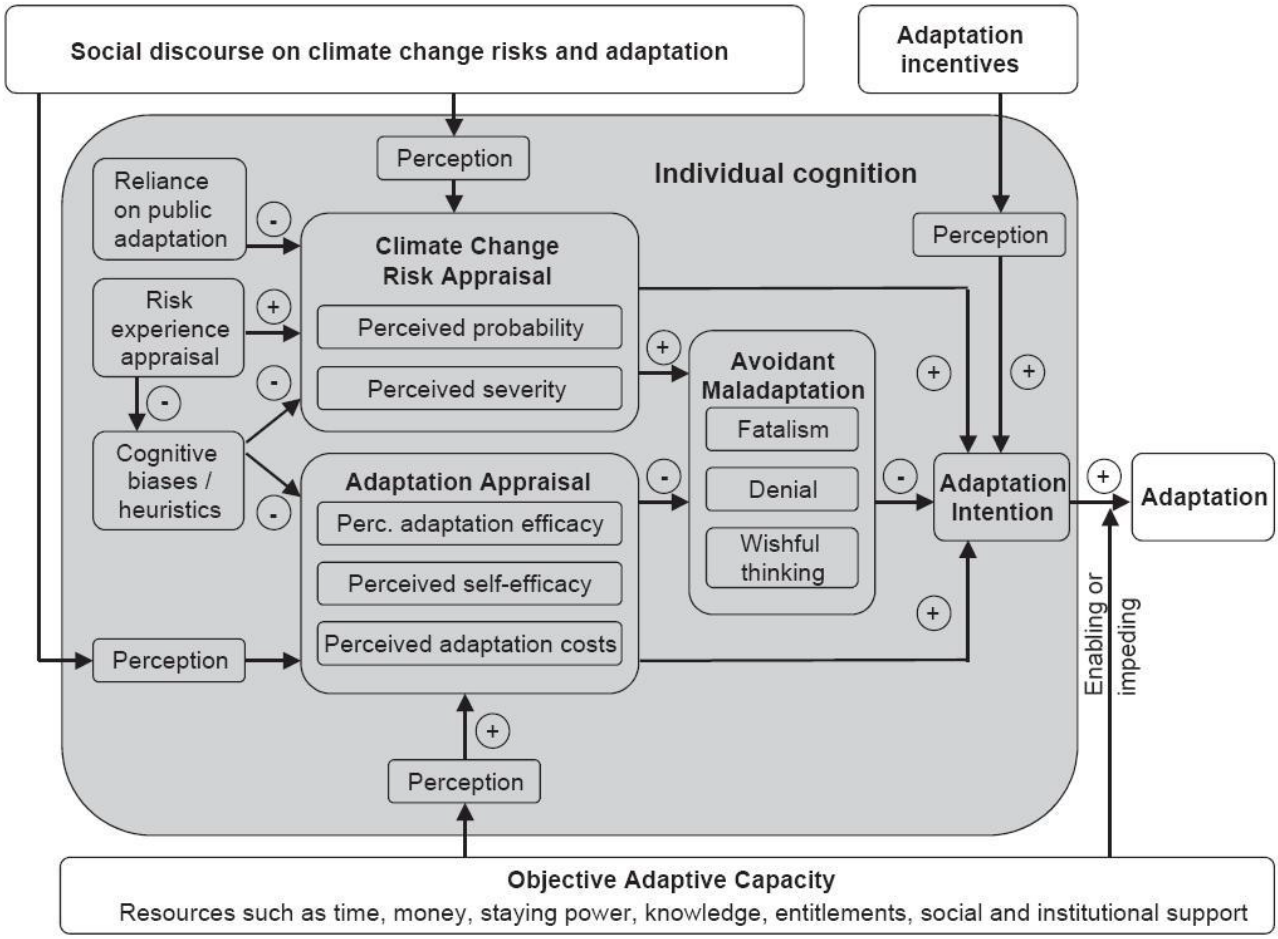
quences of behaviour and likelihood of outcomes, whereas social norms can have considered as accepted standards conveyed by peers, family, community or society.

A major facilitating factor for attaining perceived behavioural control is having previously engaged in the behaviour (De Jong 2000). De Jong (2000: 318) further argues that "intentions, expectations, norms, and gender roles are key elements inside the black box of migration decision making." The approach for this thesis is rooted in the theory of reasoned action and the theory of planned behaviour.

In an influential work that probes the decision-making process Grothmann and Patt (2005) offer two case studies from urban Germany and rural Zimbabwe to explain the cognitive influence of adaptive action is. Their Model of Private Proactive Adaptation to Climate Change (MPPACC) separates out the psychological steps involved in taking action in response to perception of changes in the environment, and examines factors that hinder or promote adaptive action (figure 2.2).

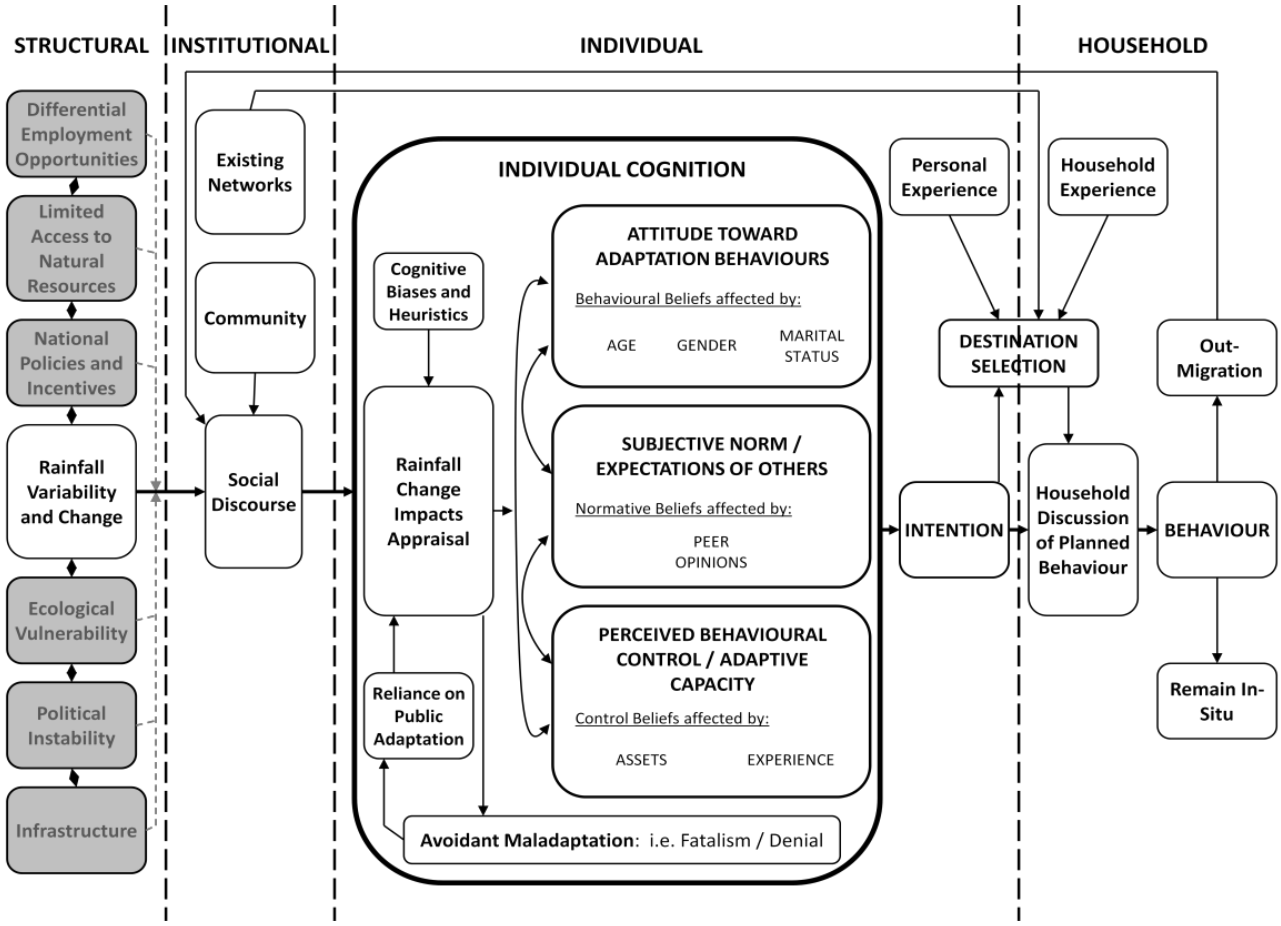
The model takes into account risk perception and perceived adaptive capacity, largely neglected in earlier research. Smith et al. (2010) further developed the model to explore the nexus of migration and climate change. The Model of Migration Adaptation to Rainfall Change (MARC) proposed by Smith et al. (2010) and further developed in Kniveton et al. (2011) builds on MPPACC and seeks to explain how individuals decide to migrate when the rainfall patterns change (figure 2.1).

Figure 2.1 ***Model of private proactive adaptation to climate change (MPPACC)***



MPACC explains explain why some people show adaptive behavior while others do not. (Grothmann and Patt, 2005)

Figure 2.2: ***Conceptual model of Migration Adaptation to Rainfall Change***



The MARC model identifies risk perception and perceived adaptive capacity as key factors that influence migration decisions-making. (Kniveton et al. 2011)

The MARC model identifies risk perception and perceived adaptive capacity as key factors in this regard and represents individual migration decision-making and related input components that shape an agent's decision to migrate under changing rainfall conditions (see figure 3). This model is divided into four hierarchies: structural, institutional, individual and household. This conceptual approach takes its theoretical basis from the social psychological theories of reasoned action and planned behaviour (Grothmann and Patt 2003) and the follow up work in Grothmann and Patt (2005).

Practically, MARC is an agent-based model (ABM), used to simulate future large-scale migration behaviour. The model incorporates related components such as social and environmental inputs that shape individuals' decision to migrate at four levels – structural, institutional, individual and household. Such studies promise process-based models of behaviour that are valid across cultures, and recognise the multi-causality of the migration decision-making and complexities and uncertainties involved in developing decisions.

The cognitive enquiries, however, tend to assume that people analytically assess and calculate the desirability and likelihood of possible outcomes, thereby underplaying or ignoring feelings about objects, ideas, choices, mental images and emotions. Theories of choice under risk or uncertainty tend to be cognitive and consequentialist, using rational choice models (Leiserowitz 2006). However, a closer look reveals the subjective nature of climate experience as climate is closely connected to the identity of people in a particular place.

People's decisions to deal with risk are not always rational, but linked to the emotional, symbolic, spiritual and environmental values they attach to the place and people's identities. Identity refers at the same time to social categories of an individual and to the sources of his or her self-respect or dignity (Fearon, 1999). Perceptions of climate risks and response options are often shaped by personal observations of a changing environment, belief in God, and significance of home and responses (Mortreux and Barnett 2009). The cultural products of a certain place often reflect the local climate. Hulme (2008: 7) argues that "registers of climate can be read in memory, behaviour, text and identity as much as they can be measured through meteorology". So in the face of climate and environmental change, decision-making is not a fully rational, deliberative, analytical act, but rather an "emotionally driven experiential system" (Epstein, 1994). This route of enquiry is a road less travelled in climate-related migration research.

2.3.2 Experience, perceptions and decision-making

Though the subjective nature of the decision-making to adapt (or migrate) is rarely studied, on a related track, Kuruppu and Liverman (2011) built on Grothmann and Patt's (2005) model, adding affective heuristics, intention implementation plan development and the stages of change. Heuristics are mental toolkits for decision-making and problem-solving; and an affective heuristic involves emotions influencing the cognitive processes. In their study in Kiribati, Kuruppu and Liverman (2011) have noted that people wanted to adapt better with more effective water management practices when they perceived climate change as a process that they could feel and relate to; and the more the people believed in their own capabilities the more they wanted to take up such measures. Though cultural practices – including traditional knowledge and rituals – may influence objective adaptive capacity while people pursue coping or adaptation strategies (Kuruppu 2009), governments and development agencies often do not take them into account when planning adaptation strategies (Kuruppu et al 2014).

On the flipside, emerging research shows that it is not only resource constraints and socio-economic factors that limit adaptation choices, but also psychological factors, habit and perceptions of climate variability (Dang et al. 2014). Therefore, migration scholars note that barriers to movement could be internal as well as external – people may not be able to move or in some situations they just do not want to move despite the risks involved in staying at a vulnerable place. Black and Collyer (2014: 52) argue that distinguishing between these two scenarios could be extremely difficult, requiring a "nuanced reframing of migration theory"' concerning "migratory space, local assets and cumulative causation".

In terms of cumulative causation, climatic stresses and shocks influence drivers of migration (Black et al, 2011a; Foresight, 2011); and these drivers have individual, household, environ-

mental and structural dimensions (Kniveton et al 2011). Furthermore, making decisions in multi-faceted and complex environments benefits from non-conscious processes in response to experiential learning during repeated exposure to novel situations, ideas, and relationships (Beratan 2007). It follows that environmental changes and climate variability are entwined with livelihood opportunities and limitations; people's experience and perceptions of climate and environment; and their expectations from alternative courses of action.

Empirical studies have tested how perceptions and expectations shape migration decisions along with socio-economic factors. De Jong's (2000: 307) logistic regression models using longitudinal data from the 1992 and 1994 waves of the Thailand National Migration Survey shows that "a strikingly different set of expectations, household demographic indicators, and migrant capital factors were significant determinants of migration intentions for men and women." Intentions could be a predictor of more permanent migration behaviour and expectancies about achieving future goals are determinants of intentions to move for both men and women. However, gender roles, including marital status and responsibility to take care of dependents, are important determinants of migration intentions for both men and women. Prior migration experience as an indicator of direct behavioural control is a strong predictor of both migration intentions and behaviour (De Jong 2000). Furthermore, De Jong's (2000) research shows that determinants of migration intentions and migration behaviour are not the same.

Taking into account socio-cognitive variables of climate risk perception and perceived adaptive capacity as key determinants of the adaptation decision- making process, Grothmann and Patt (2003) see adaptation as a socio-cognitive-behavioral process. They explain "adaptation not only as adaptive behavior, but also as changes in cognition (e.g., risk perceptions), which are socially constructed and negotiated. For example, the behavioral adaptation of communities in flood-prone areas to an increased risk of flooding due to climate change (e.g. by build-

ing higher levies or houses less prone to damage by water) is preceded by an increase in perceptions of the risk of flooding" (Grothmann and Patt 2003: 3). This thesis adds the element of migration as an adaptation strategy.

2.4 Gaining resilience and adapting to climate change

2.4.1 Bouncing back, modifying, adjusting…

Though the focus of this thesis is on determinants of migration, it draws from research on resilience and adaptation to see whether migration in the context of climatic and environmental hazards qualifies as adaptation. The rationale of this approach is that the respondents who have migrated have reported (as chapter 6 shows) that they found it a beneficial activity that helped them offset losses suffered because of hazard exposure, and better prepare for their future in risky environments. In that case, migration becomes an adaptive activity, though it is hard to measure the extent of adaption that a migrant can achieve. As such, the conceptual intertwining of migration with other societal and contextual processes comes from a socio-ecological systems approach. In this framing, social patterns of behaviour are seen to co-evolve in an environment that changes its physical, demographic, economic, social and political characters (Scoones 2004, Rammel et al. 2007, Kniveton et al. 2012). The literature shows migration often becomes foremost a livelihood strategy undertaken amid multiple opportunities, stresses, shocks and, above all, uncertainties – an activity interwoven with other societal processes (McLeman and Smit 2006). Therefore, migration can be a seen as a good strategy for adaptation to environmental change, an "extremely effective" way towards gaining long-term resilience (Foresight 2011:10).

In this regard, resilience can be defined as "a measure of the persistence of systems and of their ability to absorb change and disturbance and still maintain the same relationships between populations" (Holling 1973: 14). A later and widely cited definition of resilience calls

it “the capacity to use change to better cope with the unknown; it is learning to bounce back” (Douglas and Wildavsky, 1982: 196). Resilient social-ecological systems use a set of diverse mechanisms – learning from changes and shocks, thus sustaining themselves by adapting to disturbances (Adger et al. 2005). Resilience, in short, is not the opposite of vulnerability, but a more comprehensive concept, a route from disaster risk reduction to sustainability. It explains the capacity of a community to withstand the effect of a stressor; it is fundamentally a function of a sociocultural system. (Oliver-Smith 2012). It is the ability to plan and prepare for, absorb, recover from or more successfully adapt to actual or potential adverse events (National Research Council, 2012).

In the context of climate change, migration exists on a continuum to maladaptation by displacement to an effective adaptive response in many ways. Maladaptation denotes “an adaptation that does not succeed in reducing vulnerability but increases it instead” (McCarthy et al., 2001: 990). As a successful adaptation strategy, migration can be a solution to challenges thrown up by climate change in habitability of a place, productivity of the farm, availability of food, water and energy and exposure to hazards, prices, job opportunities – at points of origin and destination of migration (Foresight, 2011). In the context of disasters such as the 2011 drought in the Sahel and the Horn of Africa, and the 2010–2012 floods in Pakistan (2010–2012) that have caused large-scale population movements, it has been claimed that environmental change – as well as political instability – further complicated migration patterns by adding uncertainties, vulnerability and livelihoods stresses (IOM 2013). In such contexts hazard exposure to hazards, mobility can help people reduce and recover from the impact of hazards, and boost their ability to access and use material assets and social networks. It can be a mutually beneficial option for the migrants as well as their hosts (Foresight 2011).

Migration can be considered a positive step if it is a livelihood strategy that can enhance people's income and generate financial and social remittances that contribute to better resilience back home (McLeman and Smit 2006, Barnett and Webber 2010, Tacoli 2009). However, promoting migration – or resilience or adaptation for that matter – is not without its share of political problems. Recent literature has critiqued migration or planned relocation or promotion of migration as a policy option for resilience and adaptation on economic as well as socio-political grounds. Shumway et al (2014), for instance, argue that migration can help communities achieve better spatial equilibrium, or it can just amplify already unequal income distribution patterns across regions. Anlaysing migration and income change in the US during 2000–2010, Shuway et al (2014) note that countries that are the worst hit by environmental hazards are losing on account of net out migration, and because in-migrants have lesser income than those who move out. Discussing small island developing states (SIDS), Kelman (2105) argues that migration from such islands, relocating and regrouping elsewhere must consider contexts and issues beyond climate change as well as concerns and cultures of the local people.

On a different track, Kothari (2014) comments on the politics of climate change discourse while analysing the resettlement policies in the Maldives, where the government proposed to resettle communities of 200 islands into 10–15 safer islands. She shares the local as well as academic concern that climate change is used as a "political tool" by opposing parties, negating "politics of the possible" that could promote more equitable and sustainable alternatives for future (Kothari 2014: 137). Even with interventions aimed at resilience and adaptation, structural elements of vulnerability (Wisner et al 1984) can still deprive vulnerable people, or maintaining an unequal status quo could still lead to damages and even casualties (Cannon and Mueller-Mahn 2010; Frerks et al 2011).

These critical views do not take a very optimistic view of migration being a solution for problems stemming from climate change, but at the same time negate the view of migration as a desperate act of poor people in fragile, changing or degraded environments. New studies also problematise the option of planned relocation. At different levels, they challenge the framing of climate change as the key or only driver of largely involuntary migration from poorer parts of the world. They also caution against solutions that emerge from such a narrow view, especially when only environmental impacts of climate change are considered, ignoring the socio-economic and political context in which they work. A more positive viewpoint is that people moving out or made to move out of vulnerable places in a planned way are not 'victims' of climate change, but agents of change in an environment of climatic uncertainties, and hazard risks (Tacoli 2009; Foresight 2011, Barnett and Webber 2010).

2.4.2 The option to stay back and adapt

While migration can be an effective adaptation strategy, people's response to hazards need not necessarily be moving out, it could also be staying put and adjusting their livelihoods to suit the changed scenario in another form of adaptation. Adaptation can be autonomous or planned, structural or non-structural, and in-situ or ex-situ (Fankhauser et al. 1999; Smit et al. 1999; McCarthy et al. 2001). Cooper and Pile (2014) have looked at a broad range of adaptation options. They include making adaptive changes in lifestyles by living in suitable buildings; changing infrastructure land-use or livelihood; migrating; or making changes in the geographic features by building flood defense, seawalls and nourishing beaches.

In the context of climate change, research into intention and behaviour need not necessarily relate to migration, but *in situ* adaptation options as well. While adaptive actions can aim to preserve *status quo,* defending lifestyles and assets, they can also encourage incremental improvements to existing systems, tweaking resource management practices, enhancing liveli-

hoods by income diversification, improving disaster preparedness measures and sustainable development programmes (Huq et al. 2003; Smit and Wendel 2006). Remittances from migrants can supplement household income and contribute to community's ability to stay back and be productive rather than being unable or unwilling to move out. Such adaptation can also prevent larger-scale migration of whole households or communities in an "unplanned and unpredictable" way, or to vulnerable areas (Foresight 2011: 14).

Climate change adaptation involves planning for huge uncertainties with insufficient data, boosting resilience to a spectrum of shocks and stresses – by way of providing safer structures, infrastructure and services including emergency warning and response systems (Dodman and Mitlin 2013). Adaptation decision-making process, however, involves looking at conditions under which people make decisions that are beneficial to their future, even with limited data at hand and under conditions of uncertainty (Gowda and Fox 2002, Grothmann and Patt 2003). As Barnett and Webber (2010) sum up: "In many ways migration can also contribute positively to adaptation to climate change, notably through the way it can build financial, social and human capital. There are policy measures that can enhance the contribution migration can make to adaptation... However, migration in response to climate change also has its risks…" The following section discusses evidence for such migration and its outcomes.

2.5 Recent evidence for climate-environment-migration nexus

2.5.1 Mobility outcomes of stresses and shocks

The role of migration as an adaptation to climate change (Tacoli 2009, Foresight 2011) and mobility outcomes of environmental stresses and shocks (Findlay and Geddes 2011, Black et al. 2013, Penning-Rowsell et al. 2013) have risen to the top of the migration research agenda in recent years. Researchers are seeking better empirical evidence for the connection between

climate, environment and migration (Piguet 2010), even as debate continues over how strong these linkages are, how they work and what will be the future patterns. This section reviews selected recent work in this field. Research on in situ climate change adaptation and economic migration have been left out of this review. Work specifically dealing with climate- and environment-related migration in Bangladesh has been mentioned briefly, a more detailed analysis in the following chapter 3.

Much of the evidence tends to suggest that climatic and environmental factors are linked with migration, but not in a direct, one-to-one manner. This review looks at how climatic and environmental stresses and shocks relate to migration in the literature. Among stresses, droughts and rainfall variability have been associated with migration. For instance, Findley (1994) found that the 1983-1985 drought in Mali halved cereal and livestock production, making the majority of families depend on migration and remittances. However, the average migration rate did not increase during the drought – possibly due to existing level of migration already being at saturation point, or perhaps due to the role of remittances or food relief. However, the migration cycle became shorter, with short-cycle migration more than doubling, and more permanent migration declining. The short-cycle migrants came from families with lower average incomes compared with the long-cycle migrants.

Henry et al. (2004) studied migratory pathways during 1960–1999 in Burkina Faso, using environmental typologies of origins and destinations, based on rainfall variations and land degradation. Environmental factors were seen to influence the probability to migrate and the selection of a destination. It is stresses such as land degradation rather than episodes such as droughts that influenced migration more. A larger proportion of people living in areas of unfavourable conditions and land degradation migrated, when compared with those living in areas with better land, even with unfavourable climatic conditions. In another study, Henry et

al. (2004b) note that people from the drier regions are more likely to migrate temporarily or permanently to other villages than those from wetter areas. The study also showed that short-term rainfall deficits led people to migrate to other villages on a long-term basis, but reduced short-term moves to faraway places.

Barrios et al, (2006) however, found that shortages in rainfall increased urbanisation levels in sub-Saharan Africa. Van der Geest's (2011) study on the Dagara people's migration in Ghana showed that rather than degradation and natural disasters, structural differences in agro-ecological conditions played an important role in their movement and that environmental factors act in complex interplay with economic, political, social and cultural ones. Studying the out-migration in Ghana's forest-savannah transition zone using household surveys, Abu et al. (2014) have noted that even in the case of people perceiving considerable environmental stress, climate may not be the primary driver for migration intentions, unlike socio-demographic factors such as age, household size and current migration status.

Studies elsewhere have also shown a mixed influence of climatic and socio-economic variables on migration. Munshi (2003) studied migration between Mexican provinces, using rainfall variation in the migrants' points of origin to identify how network at their destinations influence migration patterns. Their rationale is that low rainfall in the distant-past increases the number of older migrants in the network, contributing to better access to jobs for migrants who come later. Migrants with better networks not only had better chances to find better-paid non-farming jobs, but also retain jobs compared with others.

Saldana-Zorilla and Sandberg (2009) studied migration between Mexican municipalities. Their spatial econometric model showed that municipalities with greater income dips and recurrent disasters (during the 1990s) had higher emigration rates. The results suggest that people may be migrating for better income prospects, a rational economic choice based on esti-

mated future returns, taking into account asset losses, available finances, and expected net assets. Kniveton et al. (2008) note that drought in general appears to increase short-term rural to rural migration, but does not affect, or even decreases international, long-distance moves.

Turning to shocks, studies have shown that though disasters can lead to large-scale displacement, such displacement is often temporary. People come back to rebuild, and when away, they prefer to live in places that are familiar to them (Lonergan 1998; Black 2001; Castles 2002; Perch-Nielson et al. 2008; Piguet 2008). In an empirical analysis, Drabo and Mbaye (2011) have reported that disasters have an impact at the same time of the event as well as after a time lag, whereas other climatic events – such as rainfall variability – have only a lagged effect.

In the case of storms and floods mitigation and adaptation capabilities are limited than for events such as extreme temperature or droughts that give people more time to prepare. Halliday's (2008) study in El Salvador shows that following shocks affecting farming, men spent more time in farm work, and more migrant men lived in the US. Most households did not send women for farming locally, or wage labour abroad. In their Sub-Sharan Africa study, Marchiori et al (2011) noted that weather anomalies have a significant and robust impact on average wages that, in turn, international migration. As Black et al (2013) argue, long-term displacement appears relatively rare in the case of extreme environmental or climatic events, however, displacement figures often note the peak level of movement at the emergency phase rather than longer-term migration. Rapid returns are usually not systematically documented (Black 2013).

Non-climatic disasters also show similar results. A study of mobility patterns after the 2010 earthquake in Haiti shows that people who left the capital city within three weeks of the event moved to places where they had social networks (Lu et al 2012). However, the 2001 earth-

quakes reduced migration of women, but not men, leading to an increase in women's domestic work hours, but not men's (Halliday 2008).

Among large-scale studies, a two-year empirical study called Environmental Change and Forced Migration Scenarios (EACH-FOR) collected evidence from eight detailed cases in South Asia and South-East Asia. It found that households tried to offset losses suffered in climate-related risks such as rainfall variability by migrating seasonally, for short periods or permanently thereby enhancing food and livelihood insecurity. The study looked at the changes of natural and human-made environment among the causes of migration and explored the linkages and consequences local, regional and national levels (EACH-FOR 2009). As EACH-FOR (2009) shows, migration is common in all the eight sites, but almost entirely within state borders, undertaken mostly by men, but with growing participation by women.

Within the EACH-FOR study, findings suggest that migration is largely for better income, and better education and skills, as demonstrated by case studies in Thailand, Vietnam, and Peru Vietnam (Warner et al 2012). It was toward cities and better farming areas in case studies in Ghana, Bangladesh, Tanzania; nearby cities as in Peru, India; and towards places with mining operations or industries in case studies in Ghana, Thailand and Vietnam (Warner et al 2012). Overall, the study suggested that rainfall variability has an impact on household income and migration decisions, and income diversification, including by migration, and education enhance resilience and adaptation. Those who lack such options run the risk of being trapped on the "margins of decent existence" (Warner et al 2012: 5).

The notion of people who do not move, or trapped populations, comes up as one of the key concerns in the Foresight report (2011) as well. Based on 70 evidence papers, focusing on three ecological regions, namely low-elevation coastal areas, drylands and mountain regions, Foresight (2011) noted that environmental change will affect migration through social, politi-

cal, economic, environmental and demographic drivers through a set of complex interactions. The report argued that people are as likely to migrate into and out of places of environmental hotspots like urban flood plains of Africa and Asia. While migration is primarily for livelihood-related reasons, environmental change will enhance people's exposure to natural hazards, and thereby influence migration patterns. The report called for planned and well-managed migration options to address the issue of immobility, as millions could be 'trapped' in vulnerable areas of poor countries, unable or unwilling to move, or could move into environmentally vulnerable areas. That means better planning of migration destinations, especially cities prone to flooding, water shortages and inadequate housing.

It may be argued that climatic and environmental stresses and shocks influence migration in positive and negative ways and the migration response of people is contextual; and migratory movements vary across time and space. An insight from the literature is that when people have the choice and capacity to migrate, it can help them adapt better to climate change, by gaining new and improved livelihood options, adding to resilience through remittances and skill sharing (Foresight 2011). The contribution of Foresight (2011) lies in such a clear framing of migration in the context of climate change, highlighting its multi-causal and complex nature, and at the same time squarely addressing the issue of immobility. Both these issues are very much relevant, especially in the case of Bangladesh. It is a country that is exposed to natural hazards (Kreft et al 2015; Harmeling 2012), effects of climate change (Huq and Ayers, 2008, Haq 2011), high levels of rural poverty and urban growth driving migration (Mazzini and Patricio 2013, Marshall and Rahman 2013) and high population density (BBS 2011).

In another desk study, echoing earlier concerns about environmental change and conflict (Homer-Dixon and Percival 1996, Myers and Kent 1999), Reuveny (2007) argued that people

from developing countries might be more likely to migrate from climate-affected areas, potentially causing conflict in receiving areas. Using Centre for Research on the Epidemiology of Disasters (CRED) data, this study calculated total numbers of people affected by natural disasters of a certain type during 1975-2001 and related it with conflicts in the receiving areas. He found that conflict was present in 19 out 39 episodes of such migration. Reuveny (2008) followed up this research with case studies of Hurricane Katrina of 2005, the US Dust Bowl in the 1930s, and Bangladesh-India migration since the 1950s. In the case of Bangladesh, the majority of the people settled in new places have led to conflicts with the local people of their destinations. In the aftermath of Hurricane Katrina, many people came back home the following year, while others preferred to stay away. Though these migrants were welcomed in general by their host communities there were tensions; the author concludes, "large-scale ecomigration could increase international tensions, perhaps instigating terrorism recruitment" (Reuveny 2008: 10).

Reuveny (2007: 659) argues that mass migrations associated with environmental degradation might trigger conflict in receiving areas because of a range of factors. These factors include "competition" for resources; "ethnic tension" between the migrants and the hosts; "distrust" between sending and receiving communities, pre-existing "fault lines" that mark tensions on account of socioeconomic issues, and a set of "auxiliary conditions" such as an underdeveloped economy and civil strife. Reuveny (2007: 660) further claims that though the model applies to "climate change-induced and ordinary migration" the scope and speed of the latter could far greater in the aftermath of "evermore frequent and intense droughts and storms."

While none of the above social and environmental conditions is necessarily or exclusively associated with climate change or migration, the argument in favour "climate-change-induced" conflict sounds far-fetched. As Raleigh (2008: 35) critiques this study: "The suppo-

sitions and conjectures mask poorly designed models of causation without reference to the mechanisms, opportunities, underlying motivations, past histories, role in international assistance and government policies on migrants." The issue with such proposed causal claims is that they fail to take in to account actual migration processes. The bold assumptions are seldom based on robust and detailed models (Findlay 2011). Environmental change-related movements tend to be short distance, with migrants choosing destinations where they have social networks, especially largely cities of the global south, and such movement seldom give rise to conflicts (Findlay 2011).

2.6. Policy implications

Recent literature suggests that recurrence of climatic and environmental stresses and shocks, including extreme events, makes Bangladesh highly vulnerable to climate change (Findlay and Geddes 2011, Black et al. 2013, Penning-Rowsell 2013), requiring very effective adaption measures (IPCC 2012, Planning Commission 2012). Events and processes such as cyclones, floods, coastal/ delta erosion and water shortage (EM-DAT, 2011) could affect migration in 50 years, largely within the country or to nearby countries (World Bank 2011, Foresight, 2011). In this context, migration plays an important role in enhancing the adaptive capacity of people as explained in chapter 3.

The benefits of migration, however, are often debated. On the one hand it is seen as an activity that contributes to better resources, aiding better income distribution with remittances from the migrants (Spaan et al. 2005); and on the other hand it is dubbed as a mark of economic dependency, hindering local development (Heremele 1997). Alternative readings, such as the 'time perspective' (Rahman 2009), take a more balanced view of migration with its negative costs dominating in the short term, but eventually spurring development. The policy analysis in chapter 8 is built around the idea that migration is part of human economic activity and it

can help people escape as well as offset losses and recover from climate and environment-related stresses and shocks, especially in the context of climate change. It is the structural context of a country – in terms of investment environment, institutions, residency, education and employment rights – that often determines the overall benefit for migrants (de Haas 2012).

However, policies tend to take a negative view of climate change-related migration (Barnett and Webber, 2010), with National Adaptation Programmes of Action (NAPAs), the basic plans for adaptation in Least Developed Countries (LDCs), often calling it a failure of adaptation, problem (Sward and Codjoe 2012). Such a negative view can badly influence policy formulation and implementation, limit options for migration and resettlement and seriously restrict the benefits of migration (Laczko and Aghazarm 2009), in effect trapping people in environmentally vulnerable places (Foresight 2011). Such policies tend to fail too (de Haas 2006; World Bank 2010). Instead, when allowed, planned and facilitated migration can be an effective form of adaptation to climate change as the literature shows. It helps people adjust to their environment exposed or degraded by climatic stimuli, by minimising harms, allowing alternative livelihood opportunities in line with social norms and processes (McCarthy et al 2001; Adger et al. 2005; IPCC 2012). While the international community seeks more action and cooperation on adaptation (UNFCCC, 2011), evidence shows migration can offset the impacts of environmental shocks and stresses (McLeman and Smit 2006, Barnett and Webber 2009, Tacoli 2009, Foresight 2011, ADB 2012). It can reduce vulnerabilities; enhance households' adaptive capacity, gain better access to natural resources, livelihoods, social networks, and markets (Gerlitz et al. 2014).

Migration can involve a broad spectrum of activities — including escaping risk (Adger et al. 2005, IPCC 2012, Penning-Rowsell 2013), surviving extreme events (Findlay and Geddes

2011, Black et al. 2013) diversifying climate-affected livelihoods (Tacoli 2011) and so on. Migrants' remittances boost adaptive capacity back home (Guzman et al. 2009, Warner et al. 2009, Foresight 2011). Migration can be a reasoned response embedded in existing livelihood patterns (Gardner 2009). It can be undertaken for short or long durations to nearby villages or faraway cities or even overseas. Even when influenced by climate-related vulnerabilities (Banerjee et al, 2012), migration is largely driven by socio-economic and other factors making up one of many complementary livelihood choices (Kniveton et al. 2008). Environmental change influences drivers of migration across a range of overlapping social, political, economic, environmental and demographic spheres (Foresight 2011, Black et al. 2011). Cutting across these spheres, disasters, development projects, environmental degradation, shortages, poverty and market changes, can often act together to amplify vulnerabilities (Stal and Warner 2009).

2.7 Chapter conclusion

Recent research focusing on the linkages among climate, environment and migration has generated new methods and evidence, and adding new dimensions to the field of migration studies. While climate change poses risk to human security, mainly by affecting livelihoods, research has shifted focus away from generalised notions of climate change and apocalyptic imageries involving mass migrations of impoverished people leading to shortages and conflicts. Nonetheless, such neo-Malthusian notions still gain currency in research and policy-making.

Slow-onset climate processes as well as rapid and extreme weather events and changes in the environment have different and sometimes diametrically opposite influences on migration. Such phenomena can make livelihood stresses even worse, forcing people to migrate in search of better income. They can also trap people in their localities for a variety of reasons –

to take care of their farm, by depriving them of the basic resources necessary to migrate, or making them move to vulnerable places (Foresight 2011). As research continues there is a need to take a closer look at specific geographies, especially areas exposed to extreme and uncertain weather such as low-elevation coastal areas, drylands and mountain regions (Foresight 2011).

At the same time, along with better evidence for the multi-causality of migration, behavioural and cognitive approaches to climate- and environment-related migration pushes the boundaries of migration studies, giving new dimensions to classical migration theories. New research takes into account multiple influences the elaborate decision-making process involved in it. It looks at individual, household, environmental and structural dimensions of the drivers of migration (Kniveton et al 2011). Such detailed understanding of a multi-faceted and complex process has policy relevance in the context of environmental change. As climate and environments change and weather extremes and uncertainties place livelihoods and human security at risk, this research can help give more insights and options of interventions that lead to better adaptation and resilience of local communities. In this context, it is important to gather evidence from different settings, especially areas that are vulnerable to natural hazards and regarding different forms of migration such as Bangladesh. The following chapter explains the environmental and climatic characteristics of Bangladesh and their influence on migration.

3.

Bangladesh: Climate, hazards and migration

A country study probing multiple reasons for migration

The place chosen for the field study of this thesis is Bangladesh, a country located at the confluence of three major Himalayan rivers where they form the world's largest delta, a climate change 'hotspot' as it is often described (Haq, 2001, Huq and Ayers 2008). This chapter explores how the country's low-altitude terrain, through which a network of three great Himalayan rivers flow into the cyclone-prone Bay of Bengal makes it particularly vulnerable to climatic stresses and shocks; and how these stresses and shocks change people's livelihoods and migration patterns.

A high population density and poverty, with a heavy dependency on natural resource-based livelihoods make human impacts of climatic and environmental threats highly pronounced (Agrawala et al. 2003). The literature describes Bangladesh as a country highly vulnerable to stresses and shocks associated with climate variability and change (Adams et al. 2011a, Poncelet et al 2010). About 31.4 per cent of the people live under the national poverty line (World Bank 2015) even amidst rapid city-based economic growth – a setting that leads to large-scale rural-urban migration within the country (World Bank 2012 and Muzzini and Aparicio 2013, for instance).

The geographic and demographic features of Bangladesh make it an ideal place to explore linkages between climate, environment and migration, and provide a setting for an interdisciplinary study in this regard as this thesis envisages. The first part of this chapter briefly describes the geographic features and hazard profile of Bangladesh, including climatic stresses and shocks, extreme weather events and environmental change. The second part looks at patterns of migration in Bangladesh and the social, political, environmental, economic and demographic drivers of migration, using the Foresight (2011) framework as described in figure 1 in chapter 1.

3.1 Hazard profile of Bangladesh

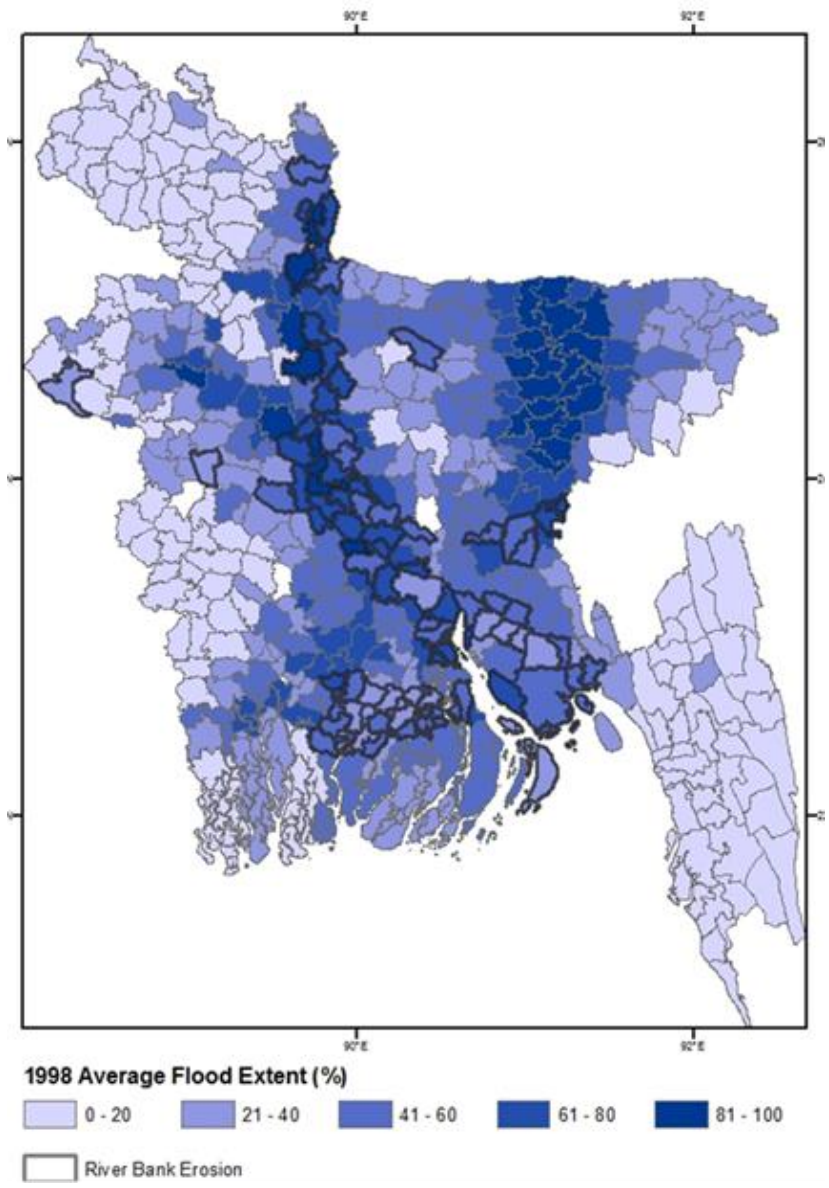
Bangladesh is exposed to a wide range of climatic and environmental hazards including floods, riverbank erosion, cyclones, food shortages, freshwater scarcity and soil salinity (Poncelet et al. 2010). A large part of Bangladesh consists of floodplains of major Himalayan rivers including the Ganges, Brahmaputra and Meghna. Flowing from the 'Water Tower of Asia', the Ganges-Brahmaputra-Meghna system together has one of the largest catchments in the world, draining an area of about 1.7 million square km (FAO 2011). It is spread across the great Gangetic plain of northern India and southern Nepal and Nepal Himalaya, the Brahmaputra basin extending northward through Assam and Bhutan and then westward between the Himalaya and the Tibetan Plateau. Rainfall variations in this area can change the river flow patterns of Bangladesh.

In its 2900 km course down from the Angsi glacier at 5,210 metres alittude, the Brahmaputra, for instance, flows through the world's deepest valley, and some of the wettest places in the world before joining the Ganges and then Meghna, weaving a mesh through their delta. It is 10 km miles wide at some places (Mahapatra 2015). The Ganges originates in the western Himalayas and its 2,525 km course passes through the Gangetic Plain of North India and then

into Bangladesh, where the main branch is known as the Padma.The Jamuna River, the largest distributary of the Brahmaputra joins the Ganga and further downstream, the Padma joins the Meghna. During the summer monsoon – when Bangladesh gets 80 percent of its yearly precipitation – these rivers have a combined peak flow of 180,000 m^3 /sec, the second highest in the world (Adams et al. 2011a).

The floodplains of these rivers sustain the livelihoods of millions of farmers, but they are also highly prone to both inland flooding and riverbank erosion. In catastrophic flood years, such as 1987, 1988, 1995, 1998, and 2004, and 2007, about 39, 61, 68, 38 and 42 per cent of the area, respectively, was inundated (Adams et al. 2011). In many cases inundation continued for nearly 3 months (CEGIS, 2002). The economic cost of these events on Bangladesh was huge with estimated losses and damages from the 1998 event (figure 3.1) alone crossing US $2 billion or 4.8 per cent of GDP (Adams et al. 2011).

Figure 3.1: ***The extent of 1998 flood and exposure to riverbank erosion in sub-districts***



The deep blue shades denote flood intensity, and the black borders line the sub-districts exposed to riverbank erosion. (Kniveton et al. 2013).

The Himalayan rivers are known not only for their flow rate and floods, but also their high velocity and the large amounts of silt they carry, leading to a combination of accretion and erosion that leads to new formation of new land areas and disappearance of existing land. Meghna Estuary has lost about 86,000 ha of land during 1973-2000 (Adams et al. 2011a). It has been estimated that between 2,000 to 3,000 kilometres of riverbank experiences major erosion annually (Islam and Islam, 1985). While past climate shocks have exerted a heavy

toll on lives and livelihoods in Bangladesh (Narayan et al. 2000), future climate shocks and stresses are predicted to result in increased flooding, riverbank erosion, and salinisation of water resources (Adams et al. 2011). The field study areas (figure 1.1) are affected by floods, erosion or cyclones. Some of the villages in these areas are exposed to more than one of these hazards, as explained in detail in chapter 5.

Global warming is leading to more rain and snowmelt in their upper catchment, the area drained by these great Himalayan rivers. Extreme rain downstream makes flood impact even worse. New projections of floods show more runoff into five great Himalayan rivers – Indus, Ganges, Brahmaputra, Salween and Mekong (Lutz et al 2014). Though there are differences between the river basins and even between tributaries within each basin, overall projection shows an increase in the runoff till 2050. That is due to an increase in the precipitation in the Upper Salween, Ganges, Brahmaputra and Mekong basins and more snowmelt in the upper Indus basin (Lutz et al 2014).

Earlier research has noticed that extreme rain events are on the rise in the Himalayas, and elsewhere in the subcontinent. A study of hourly precipitation data from 1980 to 2002 across India has shown that the north-western Himalaya and northern parts of the Indo-Gangetic basin along the foothills of the Himalaya were exposed to greater frequency of extreme rainfall (Roy 2009). Studies have also linked global sea surface temperature patterns, rainfall over India, and the stream flow of the Ganges and the Brahmaputra. For instance, Webster (2010) has noted that seasonal discharge of the Ganges is connected with the phase of the El Niño–Southern Oscillation (ENSO), a disruption of the ocean-atmosphere system in the tropical Pacific that influences weather and climate and it affects the total Indian rainfall. Summer flow in the Brahmaputra shows a relationship with sea surface temperature in the Indian Ocean as well as Northwest Pacific and snow depth during the previous spring (Webster

2010). In summary, the river flow patterns in Bangladesh could be affected by a large set of factors that are climate-sensitive.

Cyclones are another major concern. In the coastal villages of Bangladesh, cyclones pose a major threat because of their geographical reach and lingering after-effects. Cyclone Sidr of 2007, for instance, caused 4,234 deaths and affected livelihoods of 8.9 million people (EM-DAT 2015a). Two years later, Cyclone Aila caused 190 deaths and affected 3.9 million people (EM-DAT 2015a). Aila's wind speeds ranged from 74 to 120 kmph (NASA 2009). These casualty figures were significantly less than some of the earlier cyclones that hit the country as disaster risk reduction programmes, including early warning systems, appear to have saved many lives.

However, more than 400,000 people were displaced in each of these events due to prolonged damage to agriculture, fisheries, forestry, health, water supply, forcing people to move out (Roy 2011; OCHA, 2012). The field study area of Shyamnagar upazila (sub-district) as one of the areas severely affected by these cyclones. The impacts of cyclones and storm surges on infrastructure and habitats depend not only on the hazard exposure and intensity, but also demographic factors, along with socio-economic and cultural factors (Paul and Rautray 2011). For instance, while very intense tropical cyclones cause heavy damage in low-lying coastal areas in general, irrespective of socio-economic levels, at lower intensities the poorest still suffer heavy losses, whereas the rich are less affected (Peduzzi et al. 2012). Moreover, though the frequency of tropical cyclones may be reducing, projected increases in their intensity could have serious consequences (Peduzzi et al. 2012). Current estimates suggest that cyclonic storm surges might cover an additional 15 per cent of the coastal area in the next 50 years (Adams et al. 2011).

3.2 Migration patterns and drivers

Studies on climate and environment-related migration elsewhere have shown that changes in the environment, along with demographic shifts and resource shortages (Entwisle et al. 2005, 2008, 2011; Bilsborrow 2009), coupled with work opportunities and better income prospects (Carr et al. 2009) in cities encourage migration. Migration is often framed as a reasoned response in line with existing livelihood patterns, cultural expectations, gender, historical contexts, values and individual choices in the migrants' life course (Gardner 1981, 2009, De Sherbinin et al. 2008).

Drivers of migration in the case of Bangladesh could be multiple and spread across the five spheres identified in the Foresight (2011) model illustrated in chapter 1 (figure 1). Villagers with their predominantly farming and fishing lifestyles often diversify their livelihoods. They may like to earn extra income, offset losses suffered, reduce livelihood risks through diversification, and to improve their lifestyles in general, making use of opportunities offered by the country's growing economy. Their motivation for migration could include a quest for better social and economic status (Gardner 2009), an attempt to prevent or compensate for seasonal deprivation (Chowdhury et al. 2009; Siddiqui 2009), or a way to deal with demographic and economic pressures in general (Black et al.2011a). At the same time, changes in the environment, along with demographic shifts and resource shortages (Entwisle et al. 2005, 2008, 2011; Bilsborrow 2009), coupled with work opportunities and better income prospects (Carr et al. 2009) in cities encourage migration. Migration is often framed as a reasoned response in line with existing livelihood patterns, cultural expectations, gender, historical contexts, values and individual choices in the migrants' life course (Gardner 1981, 2009, De Sherbinin et al. 2008).

3.2.1 Broad patterns of migration

To understand climate and environment-related migration it is important to have an understanding of the general migration patterns in a country. In Bangladesh, people have traditionally used the option of mobility for a variety of reasons. There is a historicity to different forms of movement in and from the country. From pre-colonial times, migrants from the west (now a part of India) were attracted by the fertile but wet lands of the east; and people have moved in the opposite direction to engage in trade and labour in farms and other sectors. As Gardner (2009: 233) notes: "These constant, cross-cutting migrations are both a result of the region's turbulent history, and its turbulent environment, in which floods and cyclones mean that 'belonging' can never be guaranteed." Such a wide practice of migration is often seen as a way to offset seasonal deprivation (Siddiqui, 2009), recover from disasters and other natural hazards (Hunter, 2005) and for better living standards and social status (Gardner, 2009). Bangladesh has seen four broad types of migration covering these motives – internal movements from villages to other villages or more frequently to big cities; cross-border migration to India; short-term international migration, mostly to the Gulf countries on labour contracts; and longer-term or permanent settlement in western countries.

Among these movements, rural-to urban migration, largely driven by rapid city-based industrial development, is the most prevalent form of movement (Muzzini and Aparicio 2013). Urban growth has been uneven, led by the Dhaka metropolitan area with an estimated 15 million populations, followed by Chittagong with around 5 million people. These two big cities along with Khulna, Rajshahi, Barisal, Sylhet, Comilla and Rangpur account for about 36 million out of Bangladesh's 160 million population, largely on account of a rising share of industrial production in Bangaldesh's GDP (Muzzini and Aparicio 2013). In the cities, many

migrants find jobs as rickshaw pullers and in informal sectors such as brick kilns and construction or are self-employed in urban and peri-urban areas. In Dhaka, rickshaw-pullers alone numbered about 500,000 in 2005, constituting a total of 2 million people including their dependents and others closely associated with them (Kreibich 2012). Recent analyses show that coastal areas have shown slow growth, with the districts of Khulna and Barisal recording much lower rates of growth compared with the national average (Marshall and Rahman 2013).

3.2.2 Demographic drivers

The 2011 census (BBS 2012) notes that Bangladesh has an internal migration rate – defined as lifetime migration outside each district per thousand people – of 9.7, with rural-to-urban movements comprising 4.3, rural-to-rural 4.2, urban-to-urban 0.85 and urban-to-rural 0.36. The international migration rate is 3.46 (BBS 2012). Migration – of all of these types – can form an important source of income. In north-western Bangladesh a 1,600-household survey carried out as part of the Livelihood Monitoring Project found that 19 per cent of households migrated in the lean farming season to supplement their income (Care Bangladesh and DFID 2002). Major rural-to-rural migration takes place during sowing and harvest seasons.

Significant flows of migration have occurred in Bangladesh in recent decades in the context of changing opportunities for employment and income generation. The share of agriculture in GDP fell from 32% to 19% during 1980 to 2010 and industry grew from 21% to 28% (Muzzini and Aparicio 2013). That has meant rapid urbanisation, with one of the world's highest average annual rate of change at 2.4 per cent compared with an Asian average of 1.5 during 2010 – 2015 (UN 2014). In the past two decades, overall population growth was 29 per cent showing a 24% increase in rural and 49% increase in urban areas (Marshall and Rahman 2013). The proportion of people living in cities has reached 23.43 per cent in 2011.

It was a mere 2.43% in 1901. The urban population growth rate has shown sharp increase since the 1960s – 1961-1974 (137.6 per cent), 1974-1981 (115.8 per cent) and 1981-1991 (65.9 per cent). However, Bangladesh remains a predominantly rural country with about 76.57 per cent of its people living in villages (BBS 2014).

During 2001-2011, the peri-urban hinterlands of Dhaka and Chittagong have shown major growth, possibly due to saturation of the urban core. Meanwhile coastal areas have shown slow growth, with the districts of Khulna and Barisal recording much lower rates of growth compared with the national average (Marshall and Rahman 2013). Khulna district has shown a population decline during 2001-11 as the census figures shows, with a notable decline in urban population (BBS, 2011).

Table 3.1: ***Growth of urban population in Bangladesh***

Year	Urban population	Urban population as percentage of total population
1901	702035	2.43
1911	807024	2.55
1921	878480	2.64
1931	1073489	3.02
1941	1537244	3.66
1951	1819773	4.33
1961	2640726	5.19
1974	6273602	8.78
1981	13535963	15.54
1991	22455174	20.15
2001	29255627	23.30
2011	39847550	27.66

(BBS 2014)

However, Bangladesh Bureau of Statistics, an organisation under the Planning Commission that conducts the Census has explained that such declines are due to changed definition of city areas:

> Earlier censuses, the urban area included city corporations, municipalities, upazila head-quarters, growth centre, cantonment and urban agglomerations adjacent to large cities, i.e., city corporations termed as Statistical Metropolitan Area (SMA). In 2011, the government abandoned the concept of SMA and growth centres, thereby reducing the urban population count to 23.30% in 2011 as against 23.53% in 2001. Had there been no change, the per-centage of urban population would have been 28.00% in 2011 (BBS 2014).

3.2.3 Economic drivers

Migration could be driven by livelihood stresses caused by climate and weather-related events – it could be short-term displacement to escape inundation or migration to a village, town or a city to earn a livelihood until the following cropping season. As farms remain af-fected, landless labourers often lose job opportunities. Landless people often end up in pov-erty and hunger; and every year boys and men from *monga*-affected areas migrate to cities and better-off villages (Siddiqui 2009).

Seasonal migration is also a regular feature for people affected by droughts, especially in northern Bengal where people escape the lean period between harvests called *monga* marked by poverty and food insecurity (Findlay and Geddes 2011, Etzold et al. 2013). Such move-ments often become more common after environmental shocks and stresses, especially droughts and famines, mostly among the poor, although not necessarily the poorest who often cannot afford the costs of migration (Kniveton at al. 2009). Frequent cyclones are one of the main environmental drivers of migration. After Cyclone Aila in 2009, many people moved to other towns due to lack of working opportunities in the affected areas. Failures in cropping and shrimp farming due to salinisation could also alter migration patterns (WARPO 2006).

After hazards people move to safety and the landless among them move for income recovery (Penning-Rowsell et al. 2013). However, families prefer to stay put and migration appears to be the last resort.

Large-scale, but often unplanned, shrimp farming in the southern coastal belt has led to salinisation of the soil, and lower yields from rice fields (Rahman et al 2013). Growing water stress and climate variability reduce agricultural productivity, helping to drive rural-urban migration. Besides, riverbank erosion displaces 50,000 to 200,000 people in Bangladesh every year (Mehedi 2010). As it destroys farms and homes (Zaman 1989), sometimes communities get displaced several times (Hutton and Haque 2003). A study by Abrar and Azad (2004) in northwest Bangladesh, for instance, has found that on average households have been displaced 4.6 times by riverbank erosion. In a projected scenario of climate change, there is a likelihood of low-lying parts of delta islands and coasts getting inundated and pushing the salinity line further north, causing further water stress and crop losses (Adams et al. 2011).

The literature suggests that by working in different locations for short or long periods before returning, migrants try to earn more and save enough to help themselves and their families back home. Yet at the same time, short-term and circular internal migration can be seen as an adaptation strategy for households in districts of Bangladesh affected by droughts, cyclones and floods as climatic stresses and shocks undermine villagers' livelihoods (Poncelet 2008, Findlay and Geddes 2011, Mueller and Gray 2012, Etzold et al. 2013). A proportion of these migrants move short distances to other villages or nearby towns. Others migrate to major metropolitan cities. Though economic push and pull factors are significant in driving migration, changes in livelihood patterns are also influenced by work opportunities as well as vulnerabilities (Entwisle et al. 2005) and migration is a reasoned response embedded in social

lives and livelihoods of people (Gardner 2009). The narrative of climate and environment-related migration in Bangladesh is rather nuanced.

At the same time, as noted in Section 3.1, climate models forecast more rains and an increase in river run-off in Bangladesh, flooding, riverbank erosion and salinisation of water and soil could increase, and is expected by some to lead to more migration (Laczko and Aghazarm 2009; IPCC 2011; Adams et al. 2011). People in climate-sensitive areas increasingly adopt secondary livelihoods that are not depended directly on natural resources (Ahmad 2012), leading to an increasing trend of urban migration (Afsar 2003, Muzzini and Aparicio 2013, Planning Commission 2011). Often there are linkages between poverty and climatic and environmental stresses and shocks.

Recent synthesis studies have captured this multi-causal nature migration in Bangladesh. In the EACH-FOR project as well as Foresight report, Bangladesh appeared prominently as a case study of environment and climate-related migration. One of the EACH-FOR study papers has noted an increase in rainfall variability throughout the April-October season, and a shift to bimodal distribution pattern instead of the more common single-peak distribution; and a reduction of overall rainfall and intense rainfall in October (Ahmad et al 2012). The rainfall variability disproportionately affects poor farmers with small land holdings, and fishers by changing flood patterns (Ahmad et al 2012).

A more recent paper based on the EACH-FOR research points out that migration has become a main coping strategy for poor households, but with high social costs (Warner and 2014). Based on participatory research, a 1300-household survey and semi-structured interview in the drought-prone Kurigram district of Bangladesh, Warner and Afifi (2014: 5) note that migration is a major risk management and "coping strategy" in the face of environmental and climatic uncertainties such as rainfall variability and economic disadvantages. Over a third of

the households surveyed noticed longer dry spells and frequent droughts as a "very important" reason to migrate – landless, low-skilled and poor households being the most affected. Such migration could enhance food security on the one hand, but can be disadvantageous on the other, leading to more food insecurity (Warner and Afifi 2014). Household members often migrate to cities to cope with the impact of environmental events, even though 'environmental migration' as such is often indistinguishable as human movements are multi-causal anyway (Foresight 2011).

When households send a member to work temporarily in towns in response to diminished farm productivity due to riverbank erosion or soil salinity, or environmental stresses and shocks such as cyclones, floods, their migration routes follow established pathways; and it is often the less poor and the more educated that migrate after such events (Foresight 2011). Studies in Bangladesh and elsewhere have shown that migration in relation to climatic and environmental reasons is often connected with economic migration, and follows the similar routes and makes use of established social networks. (Bilsborrow and Okoth-Ogendo 1992, Warner et al 2012, Munshi 2003, Lu et al. 2012).

International migration is another dimension of the migration scenario. The migrants' top destinations include India, Saudi Arabia, the UK, Kuwait, Oman, the US and Malaysia (UN 2013a, Bangladesh Bank 2015). International remittances have been growing even during the global slowdown after 2008 (Siddiqui 2009). Around 8.7 million people work abroad and they sent US $14.46 billion, or equivalent to 11.14 per cent of the GDP, as remittances in the financial year 2012-13 (MOF 2014). During 2013-2014, the remittance was lesser, nearly US $11.98 billion, or roughly 8 per cent of the country's total GDP of US $150 billion (Bangladesh Bank 2015, World Bank 2015). Remittances have helped reduce rural poverty and there is an argument that more emigration could improve the country's economy (Moses 2009).

International movement also includes crossing the border to India. Historically there have been migratory and refugee movements between eastern and western parts of Bengal. The 2001 Indian national census counted 3 million Bangladeshi migrants, though some estimates suggest higher figures. There has been continued migration to India from the Khulna region, partly due to the effects of the Farakka Barrage on the Indian side that diverts part of the Ganges flow, it has been argued (Swain 1996).

At 1,087 people per square kilometre, Bangladesh has one of the highest population densities in the world (UN 2013b). An analysis of the latest census figures (BBS 2012, Marshall and Rahman 2013) suggests that the population growth rate in the coastal region is lower than that in the more developed central areas of Bangladesh. While the explanation for this differential rate of growth is migration because of the lower economic growth of the region, there are indications that hazards such as cyclones and floods also play a role (Marshall and Rahman 2013). In this framing, migration is not necessarily a step to regain lost livelihood or to get a better one, but also an effective adaptation or risk aversion strategy in response to a changing environment.

3.2.4 Climatic and environmental drivers

The large-scale movement to cities of Bangladesh are driven by different motivations. Studies suggest that migrants include people trying to escape seasonal deprivation (Chowdhury et al. 2009); recover from the impacts of natural hazards (Hunter 2005; Penning-Roswell et al. 2013); offset the projected effects of climate change (Tickell 1989; Hassan 1991; Homer-Dixon and Percival 1996; Myers 2001); and gain better social and economic status (Gardner 2009). Recent studies have examined complexities involved in determining the sensitivity of climatic factors in migration. When village-based farming and fishing are sensitive to climat-

ic stresses and shocks (Rahman and Alam 2003; Rahman et al. 2007) as well as demographic and economic pressures (Black et al., 2011), people resort to short- or long-term migration.

The motives and patterns of migration could vary – it could be pre-harvest, seasonal migration or short-distance movement following floods, riverbank erosion, cyclones, food shortages, freshwater scarcity or soil salinity (Poncelet et al 2010). Migration decisions are mainly influenced by unemployment, poverty, unavailability of croplands, poor environment and living conditions with frequent natural disasters (like floods storms etc.) making the conditions even worse (Poncelet et al. 2010). Gray and Mueller (2012) note that while household shocks reduced resources for migration, subdistrict-level shocks had a wider effect with little impact on household finances, thus driving more migration (Gray and Mueller 2012).

Other studies have also found evidence for lack of movement of people affected by hazards. Penning Rowsell et al. (2013), for instance, have found that despite major hazards – mainly cyclones, floods, riverbank erosion and drought – people do not move out or migrate in large numbers, except in the case of riverbank erosion of their homestead or farms getting salinised by salty water flooding. Similarly, using event history analysis of a longitudinal dataset from 1994 to 2010, Gray and Mueller (2012) found that flooding and non-flooding-related crop failure are the most frequent and damaging events – climate-related or otherwise. Flooding, however, has modest effects on mobility, whereas crop failure unrelated to flooding had a much more significant effect. Gray and Mueller also found that families in severely affected areas are likely to move, even though they themselves might not be directly affected. Bohra-Mishra et al (2014) found minimal influence of natural disasters on permanent migration, in comparison with temperature and to a lesser extent precipitation; thereby adding to earlier findings on the significant role disasters play in promoting temporary, short-distance moves.

At the other end of the spectrum of environment and climate-related mobility scenarios lies displacement after environmental shocks. However, such movements tend to be short-term over short distances, mostly within two miles of residence in the case of riverbank erosion in Bangladesh as Zaman (1989) shows. Several islands such as Bhola and Hatia on the Meghna river estuary have been facing high levels of riverbank erosion. Affected households often move over short distances, and often face multiple displacement, many landless families often ending up on embankments and on the riverbank itself (Shamsuddoha, and Chowdhury 2007; Biswas, and Chowdhury. 2012). Even in the case of longer-term migration, after stresses and shocks, 59 per cent of the movements occur within the district and 39 per cent outside; 81 per cent of those who move out go to city centres, 13 per cent outside the country, and 6 per cent to other rural districts (Gray and Mueller 2012).

Though disasters might not necessarily prompt long-term migration, people do move out of their place in response to climatic and environmental stresses and shock (Laczko and Aghazarm 2009; World Bank 2010); and to offset the impacts of natural hazards and their impacts on livelihoods (Rahman and Alam 2003; Rahman et al. 2007; Hunter 2005; Penning-Rowsell et al. 2013). The movement could be over a short distance till the flood water subsides (Findlay 2012), or to escape temporarily from riverbank erosion, cyclones and food shortages (Poncelet 2007), crop failure (Gray and Mueller 2012) or freshwater scarcity or soil salinity (World Bank 2010). Alternatively, it could be a longer-term migration driven by livelihood stresses (Findlay and Geddes 2011).

Migration out of coastal districts affected by cyclones, sea flooding and salinity has also gained research and policy attention of late. A large proportion of people in Dhaka, Khulna and Barisal slum are people from coastal areas (Marshall and Rahman 2013). Migration away from the coast has often been attributed to environmental reasons (Adams et al 2011)

and these movements tend to be more permanent and sustained (Walsham, 2010). Slow-onset environmental damage such as increased salinity due to sea level rise and storm surges and sudden impacts such as cyclones, often happening together with complementary effect, have driven these movements (Walsham 201

3.2.5 Socio-political drivers

Many village communities in Bangladesh are under the power of local mafias (Raillon 2010) that gain control over accretion land by using violence and make resettlement a socio-political issue (Zaman 1989). The government is trying to secure better land tenure rights for people displaced by climate-related stresses and shocks. As part of its rehabilitation initiatives, many landless and displaced people have been resettled in revenue land and *char* areas or riverine islands formed of silt. Guchhogram Climate Victims Rehabilitation Project, for instance, aims to resettle displaced people in government land (Guchhogram 2010). This initiative has been discussed further in chapter 8.

In the *char* areas where land tenure is temporary and ad hoc, poor people try to settle in newly formed landmasses. In cities, migrants often find informal settlements in urban peripheries and slums. Often new settlers – in cities as well as villages – are intimidated by the local powers, and many have to go back to their places of origin as reports suggest. Unequal and unjust land distribution patterns further add to the vulnerability of people. There is public opposition against land grabbing, forcing the Government to take further steps (Feldman and Geisler 2011). However, powerful *talukdars* (landholders) and *jotedars* (chieftains) often gain control over such land by force. The government has acknowledged the prevalence of land grabbing: As the 6th Plan document states:

> "There are land laws and policies to allot such land to the poor and the landless, but in actual allocation the interest of the poor is rarely preserved. The vested interest groups in both rural and urban areas are in de facto and de jure possession of these lands with

> the help of money and muscle. The ethnic people of the Chittagong Hill Tract (CHT) and other areas are losing their common property rights in land. In the cities, the slum dwellers pay high rent for staying in the slums and they remain under threat of eviction" (Planning Commission 2011: 68).

3.2.6 The problem of immobility

While climate and environment-related migration can be advantageous or disadvantageous as described above, Foresight (2011) cautions that non-movement or some forms of movement to vulnerable places could further enhance vulnerabilities. People affected by climatic stresses and shocks are likely to be trapped in low-lying urban areas in mega-deltas and slums in growing cities with water shortage. Even while storm shelters and early warning mechanisms help save lives in the event of cyclone and floods, they could also encourage people to stay back in vulnerable areas, raising questions about the robustness of such systems to future shock. This dilemma in the context of disaster-proofing vulnerable areas in Bangladesh has been addressed in several studies. Adams et al. (2011: 97), for instance, notes that safety measures such as flood embankments or polders could lead to more asset creation in their shadow that is deemed "safe." A combination of valuable built assets, and more extreme events could possibly lead to more human suffering and losses as the Hurricane Katrina experience in New Orleans has shown. In short, in highly vulnerable places, immobility could be a more serious risk compared with any form of migration.

3.3 Chapter conclusion

In summary, migratory movements in Bangladesh vary in terms of their drivers as well as dimensions of time and space. The analysis of existing patterns shows that while migration is largely economically driven, it could be influenced by climate and environmental factors, es-

pecially disasters. While the exposure of the country to multiple hazards make migration an important coping and adaptation strategy as literature shows, socio-political and demographic factors also often play a role. Impacts of increased flooding, storm surges, riverbank erosion and drought often lead to livelihood stresses and people make use of the income differentials between rural and urban livelihoods to offset the losses suffered or to gain more income and rebuild better.

Disaster-related migration appears mostly to be short-term over short distances, compared with planned migration in search of better livelihoods and long-term changes in weather and hazard patterns associated with climate change is expected to have implication on existing migration patterns as emerging research shows. While migration can be an adaptation strategy in the face of climate change, lack of mobility due to resource scarcity, a false sense of security or other reasons, could lead to people getting trapped in vulnerable places. There is also the risk of migrants moving to hazard-prone environments. This scenario of movement that is very prevalent amid exposure to multiple hazards calls for rigorous research into migration patterns in Bangladesh and their sensitivity to climate and environment-related factors.

4.

Research questions

Questions probing the climate-environment-migration nexus

The previous two chapters have narrated how climate- and environment- related hazards and changes influence the migration patterns of people; how researchers have studied the linkages involved; and the relevance of taking forward such an enquiry in the context of Bangladesh. This chapter formulates a set of research questions that consider this problem systematically. The research questions broadly address three dimensions of the problem – the experience of hazards, concern about risks, and their influence on migration decisions, climate and environment sensitivity of migration, and policy implications of this research. Together they attempt to give a comprehensive view of climate- and environment-related migration in Bangladesh.

First, this chapter formulates the main research question based on the literature that addresses the issue of climate- and environment-related migration in Bangladesh. Then it looks at the three dimensions of the question, namely the climate and environment sensitivity of migration, the cognitive aspects of migration decision-making and the policy relevance of this enquiry in the context of climate change and adaptation challenges.

4.1 Formulating the research questions

Migration in Bangladesh happens in the background of a set of superlative phenomena as explained in chapter 3. It is a country with one of the highest population densities in the world (UN 2012)**,** rapid urbanisation (BBS 2012), and very high exposure to extreme weather events (Harmeling 2012). Poverty levels are very high (World Bank 2015) and so are migration rates (BBS 2013). Environmentally, Bangladesh faces a set of unique disadvantages with flooding affecting over half the country, and riverbank erosion and salinisation affecting large areas of land, and frequent exposure to cyclones – with all these problems projected to worsen in a warming globe (Adams et al. 2011a). In this context, several studies have attempted to link migration with climatic stresses and shocks that affect livelihoods (Penning-Rowsell et al. 2013, Gray and Mueller 2012, Findlay and Geddes 2011, Gardner 2009, Poncelet 2009, Entwisle et al 2005). This thesis attempts a comprehensive view of climate, hazards and migration by not only looking at the influence of climate- and environment hazards on migration; but also people's hazard experiences, risk perceptions, and cognitive aspects of migration decision-making; and the policy implications of such migration.

4.2 Research questions

4.2.1 Primary research question

The primary research question has been formulated as a comprehensive one that covers all the aspects covered in the subsequent supplementary questions:

1. What is the influence of climate- and environment-related hazards on migration from villages in Bangladesh?

4.2.2 Supplementary research questions:

The main research question has been divided into five supplementary questions that cover various dimensions of climate- and environment-related migration in Bangladesh, and its im-

plications. To set the scene it is essential to consider the extreme climatic and environmental features of Bangladesh in detail, especially in the context of rural livelihoods. Therefore, the first supplementary question has been framed as:

i) What are the various climatic and environmental stresses and shocks that affect rural areas of Bangladesh?

Even when there is a record of climatic and environmental stresses and shocks, it is important to understand people's experiences and concerns. Logically, people's responses to hazards, and migration decisions are driven by their experiences and perceptions of risks (Kniveton et al 2011; Cannon et al. 2014). This approach leads to the second supplementary question:

ii) What are the changes and uncertainties in climate and environment that people experience their locality; how do they perceive the risk they pose?

Even while migration may be driven by climatic and environmental concerns, it may not be obvious to many people. Migration is primarily a livelihood strategy (Barnett and Webber 2010, Tacoli 2009, McLeman and Smit 2006), though is linked to societal, climatic and environmental processes and events. This thesis considers whether people attribute their migration to environmental reasons. This question has been formulated as follows:

iii) To what extent do people acknowledge the role of these experiences and risk concerns in their migration decisions?

As a next step, the thesis seeks statistical evidence for climatic and environmental influences on people's migration (see Henry et al 2004, Gray and Mueller 2012 for instance.) Such an enquiry not only acts as a means to triangulate the findings of the qualitative research, but also works as a way to understand long-term patterns across time and space.

iv) How do climate and environment-related hazards statistically relate with long-term migratory movements?

Finally, in a subject as relevant as climate change and migration, academic findings have a practical use in informing and shaping policy. Therefore, the thesis sets out to understand the policy relevance of these findings:

v) To what extent do policies of the Government of Bangladesh acknowledge the role of environment and climate-related migration as a climate change adaptation?

Together these questions contribute to the main research question regarding the overall influence of climate and environment-related hazards on migration from villages in Bangladesh.

5

Theory and methods

Theoretical framework and the mixed methods approach

This thesis has three underlying themes – a cognitive enquiry into people's migration decision-making, a statistical analysis of the climate-environment-migration nexus, and an analysis of state policies regarding climate and environment-related migration. This chapter discusses the methodology – the theoretical frameworks and methods adopted for each of these themes. The study of climate-environment-migration nexus draws from an integrated approach (Parry et al. 2007, Black et al 2011a) and the emerging understanding that climate change influences drivers of migration through overlapping social political, environmental, economic and demographic spheres. Data gathered from a quantitative survey covering the three districts has been anlysed using a set of logistic regressions. Understanding the migration decision-making process required an approach straddling behavioural and cognitive sciences (Kniveton et al 2011). The method used for it is a qualitative study of three hazard-prone districts of Bangladesh comprising village surveys, focus group discussion and semi-structured interviews. Policy analysis takes a text analysis approach, attempting to explain existing policies, their development process, and concerns addressed or ignored by them. The analysis comprises data from key informant interviews with policymakers and local academics, and focus groups.

This chapter explains the methodological approach and the specific methods used to conduct this research – qualitative, quantitative and text analysis. First, it describes how the thesis conceptualises the climate-environment-migration nexus; then it moves on to the cognitive model building. As the next step, qualitative methods are used to probe how people's hazard experiences and risk concerns influence their migration decisions. The next section deals with quantitative analysis that statistically examine to what extent climatic and environmental factors influence migration. The final section deals with policy analysis.

5.1 Conceptualising climate-environment-migration nexus

Climate and environment-related stresses and shocks influence human movements in many different – and complex – ways. As chapter 2 suggests, such movements happen in a continuum from displacement or distress migration that happens in the face of climatic shocks to planned economic migration as a climate change adaptation strategy. As such, movements are often multi-causal, driven by livelihood needs, but influenced by climatic and environmental factors. For instance, people often move for short periods over short distances because of disturbances to their habitats, safety and livelihoods (Poncelet 2007, Findlay and Geddes 2011, Gray and Muller 2012). Such changes might lead to people relocating or reshaping and redefining their place, livelihoods and movement patterns in an effort to rebuild viable social groups once again (Oliver-Smith 2009). Sometimes hazards do not affect or even decrease long-distance moves (Gray and Mueller 2012, Henry et al 2009, Kniveton et al 2008). At the same time, there is evidence to show that migration can be an effective adaptation strategy that helps people recover from losses suffered due to climatic and environmental hazard and be prepared better for future events (McLeman and Smit 2006, Barnett and Webber 2009). At the same time, emerging research, as noted in chapters 2 and 3, acknowledges that climate variability or change does not lead to migration in a linear way, but though several socio-economic factors that influence people's movement patterns. The challenge is to understand

how people respond to a wide range of climate and environment-related stimuli among other influences.

In such a scenario, as a first step in understanding climate-environment-migration nexus, it is important to position changing migratory behaviour as one strategy among a combination of options open to individuals, households and communities (Kniveton et al 2008). Even then climate is only one among a multitude of socio-economic, environmental, political, and demographic factors as environmental changes. Resource depletion – that often leads to livelihood stresses and migration – happens in a matrix of poverty and inequity (Lonergan 1998), closely linked to political and economic factors, including globalisation (Castles 2002). Then the task is to understand to what extent climatic factors influence the decision-making process and whether climate change and variability influence spatial and temporal dimensions of migratory movements (Kniveton et al 2008).

The literature shows that causal linkages between climatic and environmental stimuli and migration could be traced by taking two theoretical approaches, namely sustainable livelihoods and the new economics of labour migration theories (Kniveton et al 2008). The sustainable livelihoods approach (Scoones 1998) takes into account the role of five kinds of capital, namely human, financial, physical, social and natural that influence migration decisions and outcomes (Hunter and David 2011, De Sherbinin et al. 2008). The new economics of labour migration theory (Stark and Bloom 1985) postulates that migration decisions are not individual acts of migrants alone, but they are made collectively – by families or households to maximise expected income, minimise risks, offset market losses and leverage labour opportunities (Stark and Levhari 1982; Stark 1984; Massey et al. 1993).

Elucidation of evidence for the climate-environment-migration nexus involves methods that integrate different socio-economic as well as climatic and environmental variables that may

relate directly or indirectly with current and future migration patterns (Kniveton et al 2008). It involves building a logistic regression model that represents various facets of this relationship. The accuracy of such a model is determined by the strength of relationship between the variables; the characteristics of climatic and environmental factors; the linear or non-linear nature of the relationship between the variables; and the scope for defining the general characteristics or migrant's profile (Kniveton et al 2008). This thesis has tried to take into account time-sensitive migration flow data (Kniveton et al 2008). The key concern here is to probe what climatic and environmental features primarily influence drivers of migration (Black et al, 2011b; Foresight, 2011).

5.2 Building a cognitive model

This thesis works on the assumption that experiences, biases, assets and perceptions (Kniveton et al 2011) drive migration decisions. People's beliefs and attitudes shape the way they perceive risk and their values affect how they priorities, and deal with a set of risks in relation with other people (Cannon et al. 2014). Risk perception, in turn, is shaped by a complex interaction of personal experience of hazard events, the local society's attitude toward them and the general cultural environment (Smith et al 2010). While dealing with climate change and variability, relative risk perception determines people's motivation to take adaptive measures. Here relative risk perception denotes the perceived probability of being exposed to climatic stresses and shocks and to assess how harmful they could be to an individual's values in relation to other risks and challenges in life (Grothmann and Patt 2005).

The notion of people's experience of hazards and perception of risk influencing their behaviours is a step forward from neoclassical theories of migration. Sustainable livelihoods and new economics of labour migration approaches explain to a large extent the motives behind the migration decisions of individuals and their households in the face of climate and envi-

ronment-related stresses and shocks. However, these theories tend to take a simpler view of adaptive behaviour, with limited understanding of the deeper behavioural patterns that drive such decision-making (Kniveton et al. 2008). This thesis builds on earlier theories as explained in chapter 2, but looks more closely at behavioural patterns and attitudes of people who are exposed to high levels of environmental stresses and shocks, in the context of opportunities thrown open by a growing economy.

A behavioural approach to migration involves a study of subjective aspects such as underlying attitudes, values, perceptions and migration intentions. Theoretical and empirical work in this field have looked at person-environment-movement relationships (Fawcett 1985). A cognitive enquiry, however, uses a slightly different approach, focusing on thought processes that are assumed to affect the way in which people behave. In the field of climate and environment-related migration it takes into account socio-cognitive variables that influence people's motivation, and their decision-making patterns under uncertainties. Such a cognitive approach can be based on the Theory of Reasoned Action (Ajzen and Fishbein 1980) that puts intentions as a determinant of behaviour.

Based on the literature on cognition discussed in chapter 2, this thesis looks at people's attitudes to migration as well as climate change via their experience of climatic environmental threats and perceptions of the risk they pose. The thesis conceptualises migration as a process that can occur with or without climate and environment-related stresses and shocks, but possibly influenced by climate variability and change. It probes how experiences of climatic and environmental hazards and concern about the risks they pose influence people's migration decisions.

The thesis proposes that decisions are made based on a set of behavioural factors, of which the perceived likelihood and severity of environmental threats (environmental beliefs) are

possibly one influence. Beliefs broadly denote the attitudes of people, especially when they regard something as true (Schwitzgebel 2011), and involve some description of how people learn, update, theorise and model the world they live in (North 2010). This study thus argues that it is not only cost-benefit (Massey et al. 1993) or risk-resilience (Wisner et al. 2004) calculations that matters in livelihood decision-making, but also the ways in which people perceive changes and response options and act according to the socio-cultural acceptance of choices before them. Taking these nuances in to account, this thesis proposes a new model based on MARC (Kniveton et al 2011) to explain these linkages and the decision-making process.

5.3 Qualitative research probing people's hazard experiences and risk concerns

A qualitative approach contributes to empirical evidence as well as psychological exploration of the possible implications of the future influence of climate change on migration. It offers a closer look through an attitudinal and psychological lens – a peep into people's own perceptions about their vulnerabilities (Miller et al. 2010), livelihood options before them, and the decision-making process involved in staying put or moving on across different stretches of time and space. Such an approach fits in with cognitive enquiry that explores people's beliefs, attitudes and thought processes. It helps in understanding the 'black box' of decision-making.

Drawing from the research on cognitive aspects of decision-making explained in chapter 2, this thesis argues that by including attitudes toward behaviour, a subjective norm and perceived behavioural control (as well as the beliefs that make up these components) the theory of planned behaviour can explain the migration decision-making process. The intention to perform a particular behaviour is treated as a direct antecedent of the behaviour in question and is driven by individuals' perceived behavioural control, attitude towards the behaviour

and subjective norms. Attitudes represent an evaluation of the perceived consequences of behaviour and likelihood of outcomes; whereas norms can be thought of as socially accepted standards conveyed by peers, family, community or society. Recent work on this front, however, has shown that even in situations where climate-related events affect people, such events and processes do not appear to directly explain migration intentions (Abu et al. 2014). Migration drivers indeed are multifaceted and mutually interacting as this thesis argues.

The qualitative analysis part of this thesis considers the following research questions:

i) What are the various climatic and environmental stresses and shocks that affect rural areas of Bangladesh? (*This question has been addressed here from the local people's perspective, following up on the literature discussed in chapter 3.*).

ii) What are the changes and uncertainties in climate and environment that people experience in their locality; how do they perceive the risk they pose?

iii) To what extent do people acknowledge the role of these experiences and risk concerns in their migration decisions?

Question i) is a follow up of what has been discussed in chapter 3 about the climatic and environmental features of Bangladesh and their influences on migrations patterns. The chapter Qualitative Analysis probes the question more deeply from the local perspective and connects it to questions ii) and iii). The first step in this qualitative enquiry is literature review covering two broad themes, climate change and variability and migration.

To understand how climatic factors affect livelihoods, three districts of Bangladesh were selected based on their exposure to different climate related stresses and shocks and environmental change (please see table 5.1). Then 14 villages were chosen in these districts based on their exposure to different climatic stresses and shocks and environmental change generally prevalent in the area – mainly drought, floods, cyclones, salinity intrusion and riverbank ero-

sion (Table 2). The field sites were selected based on their exposure to hazards as described below and prevalence of migration; they are not necessarily representative of the overall ecology of Bangladesh.

Figure 5.1: ***Map of Bangladesh showing the sub-districts chosen for the qualitative study***

Field sites were selected based on their exposure to different climate related stresses and shocks and environmental change (Martin et al 2014)

The first district, Nawabganj, is located in the north-west region of Bangladesh under Rajshahi division, and villages here are exposed to seasonal droughts and floods (Habiba et

al. 2011). In the second district, Satkhira, belonging to the Khulna division in the south, the villages selected were severely affected during Aila and Sidr, the two most devastating cyclones and storm surges in recent times (DMB 2010; Azad et al. 2011). The third district, Munshiganj, is part of Dhaka division close to the central part of the country, and villages selected here suffer from floods and riverbank erosion (DMB 2010).

In Nawabganj, two upazilas (subdistricts) were selected for fieldwork—Nachole and Shibganj. Two villages from each upazila were taken. Nachole is a part of *barine* land or natural highlands that extends to several villages in Naogaon, Rajshahi and other districts. Being part of *barine* land, drought is a chronic problem in Nachole. The ground water level here is declining. Currently, water can be found 150 feet down though it was at 70 feet 15–20 years earlier, according to the local people. Local communities in Nachole said they experience water scarcity for at least six months from mid-November to mid-June. The other field site in Nawabganj district, Shibganj, is located on the river Padma. Two villages from a *char* area were selected for fieldwork. Formed of silt, surrounded by water most of the year, these areas are low-lying and prone to flood, erosion and drought. The villages are located along Bangladesh's border with India on the north-west of the country, 20 km away from Shibganj upazila headquarters, reachable only by a 2-hour motorboat ride. Local villagers said that in the last 40 years' riverbank erosion has led to serious losses of land, including agriculture fields. The village remains flooded for at least 3 months during the monsoon season, making it impossible to cultivate during this period.

In the southern district of Satkhira, four villages were selected close to the coast – the coastal Shyamnagar upazila was selected for fieldwork. Four villages belonging to two unions (village clusters), Gabura and Paddapukur, were studied. These unions are located about 15 km away from Shyamnagar upazila headquarters, very close to the largest mangrove forest,

Sundarbans, and the Bay of Bengal. Both the unions are surrounded by three rivers, accessible only by boat. They are vulnerable to tropical cyclones, soil salinisation, erosion and coastal flooding. The current level of salinity is too high to cultivate food crops. Cyclone Aila of 2009 had devastated these unions, destroying houses and farms, uprooting trees.

In Munshiganj, three upazilas were selected for fieldwork, Lohajong, Sreenagar and Sirajdikhan. The low-lying villages in these upazilas are vulnerable to regular flooding and riverbank erosion. Sreenagar and Lohajong stand by the river Padma. From Sreenagar a flood and riverbank erosion-prone village was chosen for the study. From Lohajong two flood-prone villages were chosen, one of them exposed to riverbank erosion as well. Sirajdikhan is located by the river Dholeshwari; three flood-prone villages were chosen here.

Table 5.1 ***Field study villages and their hazard profile***

District	Upazila	Village	Hazard expousre
Munshiganj	Lohajong	Kolma	Riverbank erosion, flood
		Mandra	Flood
	Sreenagar	Bhagyakul	Riverbank erosion, flood
	Sirajdikhan	Charipara	Flood
		Char Sonakanda	Flood
		Dakerhati	Flood
Nawabganj	Nachole	Mohanohil	Drought
		Kheshba	Drought
	Shibganj	Chorpka	Riverbank erosion, flood, drought
		Durlogpur	Riverbank erosion, flood, drought
Satkhira	Shyamnagar	Gabura	Cyclone, riverbank erosion and salinity
		Khailashbonia	Cyclone, riverbank erosion and salinity
		Paddapukur	Cyclone riverbank erosion and salinity
		Khutikata	Cyclone, riverbank erosion and salinity

The research involved collection of three sets of data. First, village surveys elicited basic information, including geographical characteristics of the area, population, livelihood, educational institutions, health care facilities, types of environmental hazards and crop patterns. The surveys elicited information on land availability, transport facilities, farming, fishing and employment opportunities. This information has been used as the background to understand the socio-economic profile of the village as well as its climatic and environmental features and hazard exposure. Then focus group discussions explored how local climate, environment and livelihoods have changed over the past 30 years. The discussions also covered migration trends, as well as current and future concerns of the local people in terms of climate, safety and livelihoods. The focus groups comprised community leaders and elders. The questions about climatic stresses and shocks included flood, drought, riverbank erosion, salinity of the soil, cyclones, as explained in the qualitative questionnaire attached as annex 1. They were based largely on recent synthesis reports that dealt with projected impacts of climate change (Walsham 2010, Foresight 2011, World Bank 2011).

Finally, 20 in-depth interviews probed further how people respond to these changes and uncertainties as well as livelihood challenges and opportunities. Individual in-depth interviews elicited detailed information on migrants as well as non-migrants and their households, and how their livelihoods changed over the last 30 years. The focus was on factors that drove people to migrate and to the extent to which climatic stresses and shocks influenced the migration patterns. The interviews probed cognitive aspects of the migration decision-making. They included questions on the problems the interviewees faced, the potential of migration to solve them, the perceived severity of climatic stresses and shocks and the perceived effectiveness of responses, including migration. They also covered family and social attitudes to migration, social networks that facilitated movement, locus of control, risk-taking and trust in advice given by family, friends and official as well as private organisations.

These observations were compared with the literature based on observed data on climate, environment and hazards. References to the literature to give the bigger picture of changes and responses. This process provided the data for qualitative analysis. That data has been analysed using the behaviour framework as explained in section 5.2. As the next step, the qualitative study probed to what extent migration is a socially acceptable behaviour shaped by experiences of hazardous events and perceptions of future risk. Based on a theoretical model explained in section 5.2, this thesis tries to explain how the decision to migrate is mediated by a set of 'behavioural factors' that assesses the efficacy of different responses, their socio-cultural acceptance and the ability to respond successfully.

5.4 Quantitative research probing climate-environment-migration nexus

The qualitative analysis probed the various climate and environment-related stresses and shocks that affect rural areas of Bangladesh, people's experiences and perceptions of risks and the way they acknowledge the role of these factors in their migration decisions. Such a study shows that drivers of migration influence decision-making in complex and interconnected ways. However, the relationship and causality in terms of what might actually be driving observed differentials in migration is still an open question, largely unanswered in the qualitative enquiry. To probe this aspect of migration in more detail, a dataset from a comparable field has been quantitatively analysed to answer the following question:

> iv) How do climate and environment-related hazards statistically relate with long-term migratory movements?

For the quantitative analysis, the data comes from a retrospective longitudinal, retrospective survey in the districts of Bangladesh listed above – Satkhira, Munshiganj, and Nawabganj. Quantitative field survey involved the collection of individual and household migration histories in the form of longitudinal data and community-level and environmental data. Individual

life history data were collected from a sample of 1490 subjects. The questionnaire covered details of migration as well as variables that could possibly influence migration; including, employment, assets base, marital and fertility histories as noted in the quantitative questionnaire attached as see annex 2. Within the selected study zones, a cluster random sampling method was deployed by dividing the population into geographic clusters (that are exposed to climatic and environmental hazards), randomly selecting sample villages, and from within the sample clusters randomly selecting households taking a probability approach giving all individuals in the population chances of being selected (Trochim 2006).

The questions elicited information on factors that can potentially influence people's decisions to stay or move out of their places. These included, including time variant factors such as age, family size, employment and well-being, as well as others such as gender and parental background. This data allowed analysis of change of residence – including migration from one village, district or one country to another – lasting a year or longer. The survey included several modules that covered relationships, children, housing history, periods of activity and inactivity, assets and businesses owned, long and short stays outside the district of birth, migrations among family and or contact circle and remittances.

The survey design is based on a model provided by the Migration between Africa and Europe (MAFE) that studied migrations between Africa and Europe (Beauchemin et al. 2012). MAFE involved collecting and analysing data that included return migration, circular migration and transnational practices (MAFE 2014). The MAFE survey was based on an earlier survey of migration in and from Burkina Faso, which was the dataset used to validate MARC (Smith 2011, Kniveton et al 2011). It focused more on internal migration, using a retrospective longitudinal survey that records residence, work and education and other socio-economic variables every year from age 6 to time of interview.

The districts and sub-districts were chosen on the basis of their exposure to climatic and environmental hazards, based on the literature as explained in chapter 2. Within the selected study districts, stratified multi-stage random samples of households and individuals in the target areas were selected in line with the MAFE methodology (Schoumaker et al. 2013). In all villages selected on the basis of their representative nature within the sub-district, a listing operation was carried out to prepare the sampling frame of households. The listing comprised identifying whether these households included migrants or not. Two strata were considered: households with or without migrants. Interviews with migrants and returned migrants were conducted at their home villages as well as migrant destinations, namely Khulna and Dhaka.

This study incorporates some additional variables, notably on experiences of environmental hazards and concern about the risk they posed. Besides, the focus of this survey is internal movements rather than international migration. (The number of respondents how have migrated outside the country are not statistically significant.) As answering the survey questionnaire on an average lasted 90 minutes for each individual, they had to be edited for optimal use of time as well as for practical and theoretical considerations. In the process several questions had to be dropped, an important one being questions concerning income. Recall of income can be complex, involving several prompts, and still unreliable. Instead, respondents were asked – for each time period – to indicate merely whether they viewed their financial circumstances as 'mostly sufficient', 'sometimes sufficient' or 'mostly insufficient'; and also whether they considered their living conditions 'better', 'equivalent' or 'less good' than those living around them.

As for theoretical justification for omitting income figures, relative income hypothesis states that an individual's attitude to money matters, especially consumption and saving, is determined more by his income in relation to others than by actual standard of living. Besides, the

consumption level is influenced not only by present levels of absolute and relative income, but also by consumption levels in during previous periods (Dunburry 1949). Practically, such subjective and relative definitions give an indication of changing levels of well-being. Coupled with more detailed information on assets (land, houses, businesses and savings in the form of gold or jewellery), it offers a basis to consider the economic drivers of migration.

For analysis, the sample was restricted to first migration out of the district. First migration was chosen as it influences the likelihood, timing and direction of subsequent movements (Balaz and Williams, 2007). Therefore, the quantitative analysis singles out the first migration and censors the rest. The first migration is defined in two ways for analysis. The first set of analyses shows the first migration outside the district by a person aged 15 or above. The second set shows the first instance of house shifting irrespective of the destination. The district has been taken as the unit of residence as a large percentage (over 80 per cent) respondents have moved out of their respective villages – so the analyses do not offer sufficient numbers for comparison if the village-level movement is considered.

The original data consists of 1,490 subjects who have answered retrospective questions. The first round of elimination was done manually to remove erratic entries. Some corrections were made to standardise the spellings of villages entered in the dataset. After further elimination incomplete entries, observation of 1386 persons was selected using Stata. The dataset yields a person-period dataset of over 28,000 data points. Each line of data point represents a year in the sample lived in the place of origin of a person before he or she has migrated outside the district. A logistic regression model has been built using this dataset, incorporating factors that are seen to drive migration at individual and household levels as the literature shows (Henry et al. 2004, Henry and Dos Santos 2012).

5.5 Policy analysis

The Policy Analysis chapter draws on the findings from quantitative and qualitative analysis (Chapters 5 and 6), probes what policies relate to them, and identifies gaps in the current policy framework in Bangladesh. As the study of public policy, or "what governments do", transcends disciplinary boundaries, and covers economic, social and political spheres (Minogue 198: 63), the analysis takes a wide perspective on policy-making and implementation in Bangladesh. Policies concerning climate-related migration require a particularly broad outlook since the drivers of such migration cut across social, political, environmental, economic and demographic spheres (Foresight 2011, Black et al 2011). Inter-relationships among these factors as well as action and inaction of stakeholders could influence the policy-making process (Keeley and Scoones, 1999).

The chapter defines the problem as whether or not policies acknowledge migration as a climate change adaptation strategy in Bangladesh. To address the problem, the chapter evaluates a set of key policy documents in the fields of migration, climate change, development and disaster management. Out of various methods of policy analysis (Gorden et al. 1993), text analysis route was taken. This approach has the advantage of giving insights into the stated government stance on the subject without changing interpretations. The documents were selected on the basis of their relevance to climate- and environment-related migration in one way or the other, even when they did not explicitly state it. However, the text analysis was followed up with key informant interviews with government officials, academics and NGO managers to understand the nuances of the text, meaning of silence about certain issues and changing interpretation of policy statements and changing attitudes to migration.

This analysis covers policies that deal with climate change, including NAPA, Bangladesh Climate Change Strategy and Action Plan (BCCSAP); development policies, especially the

Sixth Five Year Plan (2011-15) and Outline Perspective Plan (to 2021), as well as the country's Poverty Reduction Strategy Papers (PRSP) and the Millennium Development Goals (MDG) progress report; and disaster management policies such as the National Plan for Disaster Management (2010-15). The focus of enquiry is on how policies are connected with one another and address issues relating to climate-related migration in Bangladesh and acknowledge the role of such migration in climate change adaptation.

The policy language has been analysed to look at the how certain ideas, values and interests gain – or lose – currency in governance (Iannantuono and Eyles 1997). Each policy is examined to see how they define, encourage, discourage, underplay or ignore environment and climate-related migration. "Silences in discourse" have been analysed as they indicate that conflicting or contradictory values (Yanow 1992: 399). The policy language illuminates what "ideas, values and interests" are given preference in governance (Iannantuono and Eyles 1997: 1611). This thesis considers how specific policies view and describe migration in the context of climate change and associated events and processes such as increased exposure to extreme weather events and livelihood losses and (IPCC 2012). This thesis evaluated whether these policies encourage, discourage, or keep quiet about such migration.

5.6 Chapter conclusion

The three empirical chapters on qualitative, quantitative, and policy analysis give a complementary view of the challenges and opportunities offered by the climate and environment-related migration in Bangladesh. They examine the migration trends in Bangladesh, tests their sensitivity to climate- and environment-related hazards, and places the findings in the context of the broader socio-economic and political realities and policies of the country.

Conceptually this thesis draws from neo-classical migration theories, but test their limits, and builds a cognitive framework to understand migration in Bangladesh in the context of climate change. It also develops the behavioural approach, especially in the realm of cognitive enquiry, to understand migration decisions taken under climatic and environmental uncertainties and extreme events. The complementary enquiry in the policy field completes the picture by exploring enabling, disabling factors of migration. Such a rounded approach informs the researcher not only about various facts of mobility in Bangladesh, but also reasons of immobility or restricted mobility.

On another plane, the three empirical chapters provide evidence for climate- and environment-related migration by effectively using a mixed methodology. It adds to the recent body of work that underscores the multi-causal and complex nature of such migration. On the policy front, it examines the relevance of government policies in a world facing the challenges of climate change. On a practical, local level, such an enquiry using multiple methods can contribute to evidence-based planning, policy and interventions in the sphere of climate- and environment-related migration.

6.

Qualitative analysis

Migration decisions amid uncertainties

As Bangladesh already has high levels of economic migration, at one level this chapter looks at livelihood choices amidst new economic opportunities and development patterns. At another level, it looks at how climate and environment-related stresses and shocks make livelihoods difficult and make additional or better income necessary for the villagers, thereby influencing their migration decisions. Further, based on the literature on behavioural and cognitive aspects of migration discussed in chapter 2, this chapter looks at people's experiences of climatic and environmental hazards, perceptions of the risks they pose, and their influence on their decision-making process.

The chapter uses qualitative methods – a village survey, focus groups and semi-structured interviews – to understand local people's perspectives on these stresses and shocks; their experience of changes and uncertainties associated with them; their perception of associated risks; and the overall influence of these factors on their decision to stay put in their place or move out. It considers how people make their migration decisions in a context of city-based economic growth, large-scale rural-urban movement (Muzzini and Aparicio 2013, BBS 2013, Marshall and Rahman 2013); and exposure to climatic and environmental hazards in a changing climate (Adams et al. 2011a). The argument here is that it is not only cost–benefit (Massey et al. 1993) or risk-resilience (Wisner et al. 2004) considerations that matter in livelihood

decision-making, but also the ways in which people perceive changes and response options and act according to the socio-cultural acceptance of choices before them.

To explain this decision-making process, this chapter has been structured on the cognitive analysis framework (Figure 5.1 of chapter 5) based on earlier work dealing with adaptation decision-making in the context of climate change (for instance, Grothmann and Patt 2005, Kniveton at al 2008 and Kniveton et al 2011). The framework comprises environmental beliefs and a set of behavioural components. The environmental beliefs comprise the respondents' narratives of environmental stresses and shocks based on their own experience. The behavioural components comprise three factors – people's experiences of changes and uncertainties in their locality; perceptions of the risks they pose; and the way people make migration decisions informed by these experiences, perceptions and a set of socio-cultural and cognitive determinants (Martin et al 2014)[1].

This chapter considers the following research questions:

The qualitative analysis part of this thesis considers the following research questions:

i) What are the various climatic and environmental stresses and shocks that affect rural areas of Bangladesh? (*This question has been addressed here from the local people's perspective, following up on the literature discussed in chapter 3.*).

ii) What are the changes and uncertainties in climate and environment that people experience in their locality; how do they perceive the risk they pose?

iii) To what extent do people acknowledge the role of these experiences and risk concerns in their migration decisions?

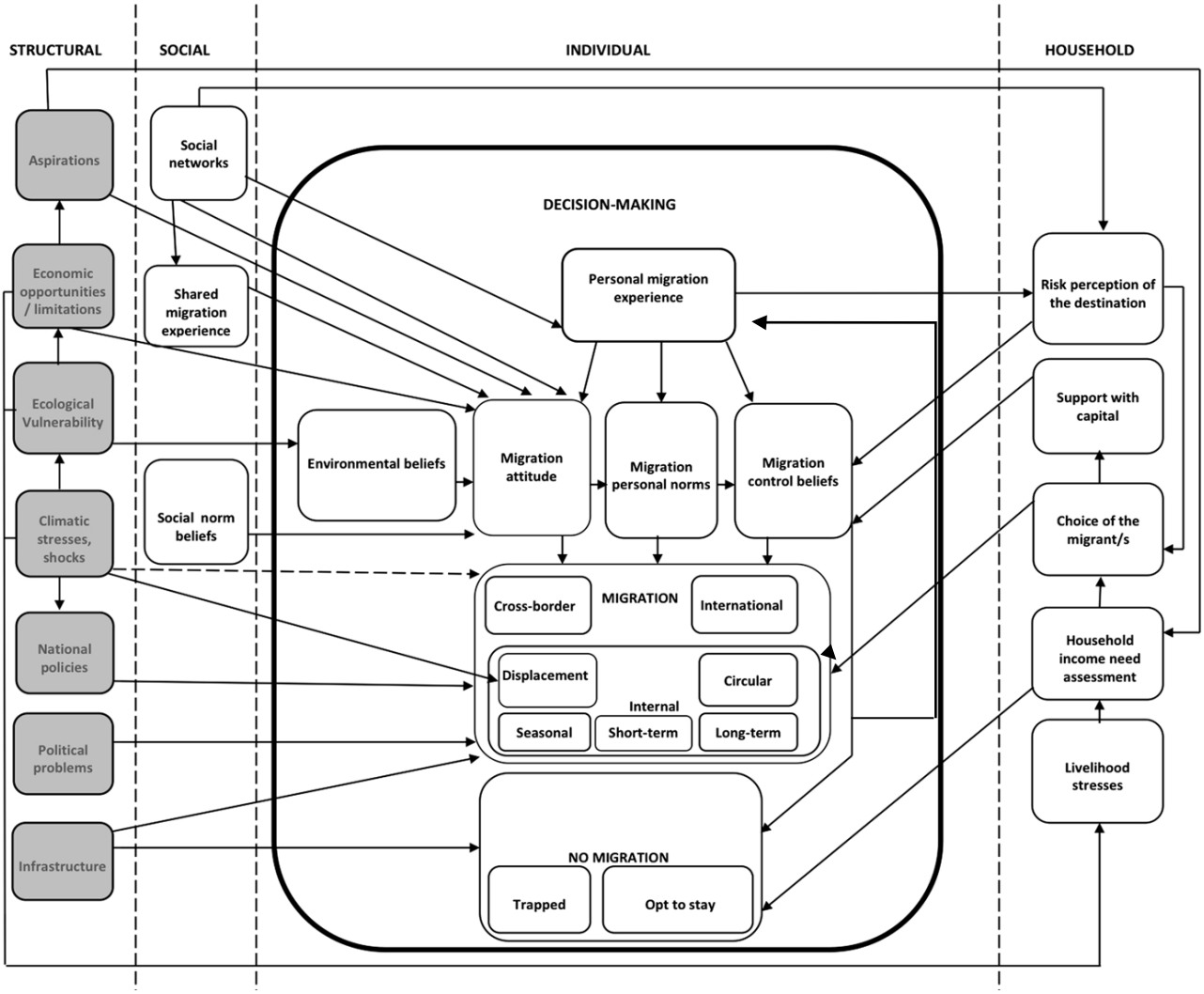
[1] This chapter is substantially the same as Martin et al. (2014). The candidate played a key role in qualitative study design, coordination, analysis; and he wrote the journal article as the lead author.

6.1 Modelling individual decision-making process

People's narratives about influences over their migration decision-making can be broadly classified into a set of environmental and behavioural factors. As explained in the methodology chapter, the qualitative survey has been influenced by the MARC model (Smith 2011, Kniveton et al 2011) that explains the individual decision-making process. The migration decisions are influenced by household and social characteristics, norms and beliefs as enabling and limiting factors that operate at a broader structural level. The decision to migrate could mean different scales of movement across time and space; and not to migrate could mean choosing to do so, or being unable to move, being 'trapped' (Foresight 2011). Structural factors – that include aspects of environment, political economy and policy setting – form the backdrop in which migration decisions are taken.

Considering the above aspects, the narratives of people about their experiences of climate and environment and the perceptions of risk they pose have been incorporated into a conceptual model (figure 6.1). The model has been built on the basis of fieldwork findings, taking into account characteristics of climate- and environment-related migration in Bangladesh. It is a step forward from the MARC as it incorporates migrated across different distances, distinguishes between livelihood stresses as well as household income needs, and deals more specifically with aspects of immobility due to choice or inability.

Figure 6.1: ***Model of migration decision-making***



Drawn from MARC, this model considers people's decision to stay back and inability to migrate (Martin et al 2014)

The factors considered in the proposed model (figure 6.1 above) are described below:

1. Environmental beliefs: Perceived probability and severity of threats posed by the impacts of climatic stresses and shocks and environmental change.

2. Behavioural factors:

a) Migration attitudes: assessment of migration options and their efficacy as a live-lihood choice

b) Migration control beliefs: generalised expectations about the extent to which people think they can control events that affect them (locus of control, as explained in Rotter 1966; Leviston et al. 2011) and the perceived resources available for migration

c) Migration personal norms: self-concept as opinion leader, perceived level of risk and innovation; and

d) Social norm beliefs: perceived trust in and influences of sources of advice, traditions and cultural factors

6.2 Environmental beliefs: *Experiences of climatic and environmental stresses and shocks, and risk perceptions*

This section comprises respondents' narratives of experiencing changes and uncertainties in their local climate and environment, based on focus group discussions and semi-structured interviews as explained in chapter 5. The background for this research, namely the influence of climatic and environmental factors on people's livelihoods and migration has been explained in chapters 2 and 3. Further, there are specific changes already being noticed by scientists. Such changes have become reference points for framing focus group discussions and interviews. These include more rains and an increase in river run-off, leading to flooding and contributing to riverbank erosion (Laczko and Aghazarm 2009; IPCC 2011; Adams et al. 2011a). Rain gauge observations show an increase in March–May rainfall by 3.4% and a decrease in June–August rainfall by 1.7% between 1960 and 2003 (Karmalkar et al., n.d.). Climate models predict a wetter future for the country as well as upstream areas of its great rivers, especially the Himalayas, where they originate (Adams et al. 2011a; Dasgupta et al. 2011; Immerzeel et al. 2013). Floods (EM-DAT 2012a) and riverbank erosion (Mehedi 2010) affect and displace large numbers of people temporarily or permanently.

At the same time, the number of hot days and nights with mean minimum and maximum temperatures increasing by 0.15 and 0.11 degree C per decade, respectively, from 1960 to 2008 (Shahid et al. 2012). This rise compares with the IPCC (2007) finding that the mean annual global surface air temperature has increased by about 0.74 degree C over the past century, land surface air temperature increasing more than sea surface temperature. Though the average rise appears to be small, the maximum (in November at a rate of 2.7 0C per 100 year) minimum temperature (in February at a rate of 3.4 0C per 100 year) have considerably increased (Islam 2013). This increase has been more during1978-2007 compared with 1948-1977. Extreme temperature has claimed 700 lives in 2002; 153 in 2003; and 135 in 2009 (EM-DAT 2015b).

The literature also shows that droughts, especially in the north-western region (Warner and Afifi 2014), and other climatic environmental shocks and stresses undermine livelihoods (Gray and Mueller 2012, Findlay and Geddes 2011, Poncelet 2007). Not necessarily related to drought, water stress due to a variety of reasons is another environmental stress that people face. The literature shows that the reasons include reduced inflow of fresh water into river systems, the over-extraction of groundwater, drainage congestion, and river flow restriction caused by India's Farakka barrage across 16.5 kilometres from the international border at Nawabganj district. These impacts appear to cause a northward movement of the salinity line and degradation of mangrove forests (WARPO 2006; Swain 1996). Saline water left by cyclonic storm surges is another reason for the water stress in coastal villages. This has arguably led to salinisation of fresh water resources and soil, making agriculture impossible for many months after the events. The projected increase in the intensity of tropical cyclones and consequences (Peduzzi et al. 2012) could lead to more coastal areas coming under the impact of storm surges in future (Adams et al. 2011a). As result of this combination of factors, Bangladesh villages are exposed to gradual onset climate-related stresses and sudden shocks,

including water shortage, cyclone, floods and coastal/delta erosion (MOEF 2005). The following section tries to capture local perspectives on these phenomena and their linkages with migration decisions.

The focus groups and interviews suggest that people across three geographic zones of Bangladesh – coastal, midland plains and north-eastern highlands – share certain common concerns. One such concern reported is irregular or uncertain rainfall that affects farming. Focus groups in two villages each in Nawabganj and Satkhira and three villages in Munshiganj mentioned such rain as something that "affects", "damages" or "threatens" farming. The perception in general is that rainfall is insufficient for agriculture, even in places that are threatened by occasional floods. The respondents used the terms "unpredictable", "irregular" and "decreased" to describe the rainfall trends.

Flood and riverbank erosion are two other common problems that the respondents have reported from all the three regions. In Munshiganj and Nawabganj, the villagers consider the 1998 flood as the worst calamity in recent years. People in all the three regions felt that there could be more crop failure in the coming decades due to floods. At Bhagyakul in Munshiganj district, many respondents said that riverbank erosion has made floods even more fearsome. For example, local people noted that since 1975–1976 the River Padma has eroded its banks, widening to two miles, submerging almost half of village by 1984. In Kolma, Munshiganj, the villagers said that erosion is a regular feature, leading to permanent migration of many families to cities. They noted that while in 1987–1988, a few new *chars* (riverine islands) emerged, but from 2004, erosion worsened, becoming devastating during 2006–2007. In the nearby Charipara, part of the village submerged during the mid-2000s, displacing 40 households to a neighbouring village, leaving only 100 families in the original place, as the villagers narrated.

A 60-year-old woman in Munshiganj narrated how riverbank erosion forced her to move to another village: “I am a direct victim of Padma river bank erosion. I had a homestead of 24 decimal (0.24 acre) land and also 3 *bigha* (1.2 acres) cultivable land in Kolma union, which were inundated by the gusty river Padma in 1997. It took just two days for the river to swallow my homestead and a month for my cultivable land. Immediately after erosion, we moved to this place two kilometer away from what used be our home. Along with other, two (other) households we rented a 10 decimal (0.1 acre) piece of land; and together we pay the owner 9000 taka (GBP 74) every year. We built houses on this land with our money. Since then I have been living on this piece of rented land.”

While riverbank erosion leads to permanent displacement, cyclones displace people in their immediate aftermath and then leads to seasonal migration as farms remain damaged and fallow after cyclonic storm surges. At Gabura in Satkhira district, the villagers said that Cyclone Aila of 2009 was the most devastating event in recent times. It flooded the whole village that is surrounded by rivers. In the *char* areas of Satkhira, the villagers said that Cyclone Aila left fields waterlogged for many months leaving the soil and aquifers salinised, making fresh water scarce and farming impossible. A seasonal migrant in his late 40s from Satkhira district responded: “I am still struggling to find (a) livelihood. If (only) I work I can eat, but this is pitiful at this age. Riverbank erosion is taking away my land. Cyclone Aila destroyed my trees and resources. Now I do not have any resources.” The perception of the villagers in Satkhira is that the frequency and/or intensity of cyclones has increased in the last few decades and their impacts are likely to worsen.

In all the three districts studied, people have reported that they felt the temperature rising, especially during summer months. “This year, the heat is extremely intolerable,” said a villager in Nawabganj. Many people also reported serious water stress. In Nawabganj, the villagers

said that drought has become more severe over the past decade with, for example, a number of tube wells drying up. A farmer in his late 20s said: "The water level is going down day by day. Now water can be found 160 feet down. Ten years ago the layer of water could be found 100–120 feet down." In the *barine* areas, drought is a perennial problem. In Nawabganj, the villagers called water stress a 'crisis', an expression that finds mention in policy documents (WARPO 2006).

The narratives show that people in different regions of Bangladesh perceive a wide range of climatic and environmental stresses and shocks, and they are concerned about the risks they pose. They are concerned about rising temperature – though the rise has been gradual and small – uncertain rain and dipping groundwater levels. Salinity is becoming a threat that affects farming and drinking water availability in coastal areas. In some cases such as riverine islands exposed to cyclones and erosion, people feel that such shifts are becoming more serious. There have been cases of reduced crop yield and crop losses. In short, people's narratives show a wide range of climatic and environmental stresses and shocks that affect their security, well-being and livelihoods. Changes and uncertainties pose further risks to their day-to-day lives and income prospects.

The following section examines to what extent these experiences and perceptions of risk influence the migration decisions of people.

6.3 Behavioural factors

The research question addressed in this part is to what extent people acknowledge the role of climatic and environmental hazard experiences and risk perceptions in their migration decisions. The research focused on migration as a response of individuals, families and communities to a range of stimuli. The narratives shared by the villagers in the study areas show that their migration decisions depend primarily on a set of socio-economic and cultural factors;

and they carefully consider the pros and cons of their responses to climatic and stimuli. To analyse this decision-making process further, the behavioural components associated with this decision-making process have been disaggregated into migration attitudes, migration control beliefs, migration personal norms and social norm belief

6.2.1 Migration attitudes: Migration options and their efficacy as a livelihood choice

Migration attitudes comprise an assessment of migration options and their efficacy as a livelihood choice. Focus group discussions and personal interviews probed to what extent migration becomes a way for better livelihoods. The questions probed the behavioural factors behind the decision to move. The interviews questions covered hazards experience, risk perceptions as well as perceived benefits brought about by migration, though not necessarily linking climate and environment with migration. Such an approach was necessary to prevent priming people on climatic and environmental influences, subconsciously influencing their answers.

As for the background, Bangladesh is a predominantly rural country with 54 per cent of rural work force engaged in farming and the rest in rural non-farm sector that is related to farming activities; so the transition from poverty in the country still has been dominated largely by higher income within the farming sector (World Bank 2012). Agriculture (including crops, livestock, fisheries and forestry) accounts for 21 per cent of the national GDP (World Bank 2012). Since the 1980s, however, structural changes in the economy has fuelled urban growth, and the contribution of farming to GDP fell from 30 percent in 1990 to about 20 percent in 2010; and the contribution of the urban sector to GDP increased from 37 percent in 1990 to an estimated 60 percent in 2010 (Muzzini and Aparicio 2013). For an average village household, that has meant the share of income from farming dropping from 59 to 44% between 1987–1988 and 1999–2000, with services and remittances making up 35–49% of in-

come (Afsar 2003). Meanwhile labour force from the countryside driving city-based growth (Toufique and Turton 2002). The government acknowledges a sharp increase in migration to cities amid rapid urbanisation in the country (Planning Commission 2010). Even with a range of rural development measures that have made agriculture more productive and rural income generation activities diverse (Planning Commission 2011, 2012), migration still continues in line with an international trend of diversification of rural livelihoods, including by increased mobility (Tacoli 2011).

Set against this socio-economic context, migration is becoming a means to improve income, offset losses suffered due to climatic and environmental stresses and shocks, overall contributing to resilience of rural communities. People living in climate-vulnerable regions, especially, try out secondary livelihoods that are not dependent on natural resources (Ahmad 2012). Faced with price hikes and wage drops during pre-harvest intervals, farm labourers often do other work or migrate to cities (Chowdhury et al. 2009), where jobs are easier to find than in villages (Afsar 2003). Migrants often join factory jobs, casual labour, open small shops, or pull rickshaws. Women often migrate to work in garment factories. Such work in cities often gives adolescent girls a transition period from childhood, instead of early motherhood as it might happen in a traditional village setting (Amin et al. 1998).

In this context, Kuhn (2003) has identified two types of migration in Bangladesh. Poor village households send a family member to a city; or households that have lost their village-based livelihoods often move out to a new place, migration becoming an adaptive option in both cases. The argument here is that migration is a planned move for adaptation, except in the immediate aftermath of extreme climatic or environmental events, when it could be a coping strategy.

In all the three districts, the respondents said that the past four decades have seen a shift away from farming, traditionally the livelihood of majority of the villagers. Their ancestors were farmers, who sometimes fished, or gathered minor forest produce – such as bamboo, cane, palm leaves for thatching roofs, honey and bee-wax – from the Sundarbans mangrove areas of Satkhira and elsewhere. The new generation, however, has adopted a basket of livelihoods ranging from shrimp farming and vegetable selling to casual labour or small trade in a town or a city. Many of them would migrate during the lean season or commute daily to a town. They would take up multiple roles as a farmer, rickshaw puller, seasonal migrant, daily worker in town, toy seller and so on, depending on the season, the need for money and job availability.

Elsewhere, environmental changes coupled with economic opportunities have led to a shift away from agriculture as the focus groups have revealed. In Munshiganj district, affected by frequent floods and riverbank erosion, such a shift can be clearly seen. At Charipara, for instance, the share of farmers in the village population has reduced from 60 to 30 per cent and fisherfolk from 25 to 15 over the past 30 years, as the villagers noted. In the nearby Mandra village, the number of farmers has "reduced drastically," as the local villagers noted. Elsewhere in the district, at Dakerkhati, 75 per cent of the people were reported to pursue farming, unlike 30 years ago when "everybody was a farmer". The devastation caused by the 1988 flood and continuing riverbank erosion that inundates fields further accelerate such a shift from farming. Erosion leads to displacement too. Charipara, a village of about 2000 people, has seen migration of 30 families as a result of erosion during 2007–2008, as the focus group discussion has revealed.

Migration patterns, however, differ across the districts. In the *char* areas of Nawabganj, migration has been a way of life, as the villagers narrated. In Chorpka, a village on the river

Padma inhabited since 1980, for instance, annual floods often last 3–4 months and erosion affects farming, so job opportunities are limited. At least 10 per cent of the households depend on internal migration, as the villagers said. A 35-year-old woman here told her story: "In 1998 we were displaced due to flood and riverbank erosion. At first, we migrated from Radhakantapur to Sohimullah village. Again we faced the same disasters in 2000, 2004 and 2008 there, so we came to Chorpka village." Her husband tried to start a ferry service in a village called Dinajpur, failed, moved to Chittagong and then moved to Mymensingh. "There is no other way to fight hunger," she said. "Besides, we need good savings for our children's study… Marriage of three daughters is also a tension for both my husband and me." As per the prevailing local tradition, often the bride's family is expected to give a large amount – as cash or kind – as dowry to to the bridegroom or his family.

In Chorpka and Durlogpur, villagers said they used to cross the Indian border five kilometres away to work in rice fields or to trade in goods and cattle. They said that a border fence and tighter patrolling since 1995 have restricted this movement and that there has been an increase in migration to other districts within Bangladesh hence. In the *barine* highlands of Nawabganj, drought drives migration: "Economic hardship is the main reason behind my decision of migration… In the village, in a year jobs are available only for 6 months in the agricultural land due to drought," a migrant farmer in his early 20s said.

However, most people do not acknowledge such a direct link between hazard risks and a shift from farming livelihoods. At Dakerhati in Munshiganj, a village that suffered floods in 1998, 2004 and 2007, a 30-year-old carpenter said: "I was unemployed before migration. My migration was driven by my desire to lead a better life, not by any natural calamity." In this village, over the past 10–15 years internal and international migration has been a way of life. In the focus group here, however, people said they did not see migration as a solution to the

problem of environmental hazards; except for landless labourers, who move to cities and towns during the lean season. Migration, instead, is seen as a way to improve the household income.

The narratives, however, do acknowledge the presence of climatic stresses and shocks, and changing nature of weather patterns and their indirect influence on migration. For instance, a 42-year-old farmer from Nawabganj said that that rainfall from mid-July to mid-September has decreased in the last 10 years. "Due to lack of rain, the land cannot be irrigated. (We are) totally dependent on deep tubewells; even that cannot work during extreme drought season (summer)," he said. At least for six months a year he has to migrate to work as a rickshaw puller. His reasoning is that it is economic needs that drive migration, though climatic factors influence migration decisions: "Economic hardship is the main reason behind my decision of migration... I migrate seasonally as jobs are not available here round the year. In the village, in a year, jobs are available only for six months in the agricultural land due to drought that puts my household under serious economic pressure. During the rainy season and winter, some work can be found in the village. This includes sowing seeds, and cutting paddy as day labourer." An inference can be made that even when migration is indirectly linked to the way people experience and perceive climatic stresses and shocks, they often do not make that linkage.

Such narratives show the difficulties involved in earning a livelihood in marginal, hazard prone areas for many people. Disasters dramatically disturb the precarious balance that they would have struggled to achieve, as a Satkhira farmer in his mid-40s narrated: "On 25th May 2009, at 3pm the 7-foot-high tidal wave Aila suddenly destroyed everything. My homestead, livestock, and all other goods floated away in the water. I took shelter in Khailasbunia School. After 3-4 months, I migrated to Sreengar *thana* (sub-district) of Munshiganj district

with my two elder sons in search of livelihood. Now I work as a wage labourer, and seasonally migrate for work." In such scenarios, migration becomes a coping strategy.

The respondents of Satkhira acknowledged that the cyclone caused abrupt, unplanned movement. People had to leave their low-lying villages, and move to other places on a higher plane, sometimes to clusters of temporary shacks built on embankments. Three years hence, at the time of the interviews, Aila's legacy lingered on as the villagers could not grow paddy in their farms due to salinity left by the storm surge. It was a sudden shift in an already hostile environment. "Dramatic changes occurred after AILA of 2009," recalled a 45-year-old farmer and seasonal migrant from Sathkhira. "The village farms became water-logged for two years. That made soil and water saline. All trees, grasses died. No vegetables, agricultural cash crop is growing." The result has been devastating: "Food is scarce. We need to buy everything due to salinity of the soil… poverty, monetary crisis, scarcity of fuel to cook…,"

Three years after the cyclone, men spent winter months, when there is no farming in the area, migrating to towns and cities. Earlier, only 10 per cent of the people migrated, but after the cyclone, 50–60 per cent of people moved for temporary or seasonal work in other districts such as Gopalganj, Jessore, Khulna, Magura, Bagerhat, Madaripur, Munshiganj and Dhaka, the villagers said. A government ban on local shrimp farms – because it damaged the environment – and irregular rainfall has also contributed to an increase in migration, the villagers said. Some shrimp farmers had let in saline water by breaching the embankments, leading to an even worse impact due to the 2009 storm surge, the villagers added. This violation lent credence to the environmentalist's call for a ban on aquaculture in the area. Some of the responses shared visions of a bleak future of the place: "Due to regular floods people almost cannot do anything during that time. It offers no opportunities to do any business."

The distance and duration of migration differ across the study areas. Migration could be internal to Bangladesh, as in most of the villages studied, or international as it is noticed sometimes in Munshiganj. In Charipara village of Munshiganj, 10 per cent of people work abroad, mainly in the Gulf countries, Singapore and Malaysia according to the villagers. In Mandra, about 40 per cent of the households have one or more migrants working abroad. At Bhagyakul, in the same area, 50–60 per cent of the households have an international migrant, the local villagers said. In Mandra, the villagers said many of them commuted to Dhaka, the capital city that can be reached in 20 minutes by bus. Some people migrate to work in garment factories in Gazipur and Narayanganj districts, networking through those already working there. From Bhagyakul, some men migrate to Chittagong to sell utensils and silver and plastic ware. While internal migration from Munshiganj is not as pronounced as in the other regions, the district also serves as a destination point for migrants from the coastal belt of south-western Bangladesh as well as the drought-prone northern districts such as Kurigram and Rangpur (Ahmad et al. 2012).

The narratives in this sections show that people view migration as an activity that contributes to better livelihoods in a context of exposure to climatic stresses and shocks. The results in general suggest that migration is seen primarily as an economic activity, a livelihood choice. In many cases climatic and environmental stresses and shocks work in the background making livelihoods difficult and destroying habitats and means of livelihoods. However, except in the case of disaster-induced displacement, people tend not to associated environmental and climatic stresses and shocks directly with migration.

6.2.2 Migration control beliefs: expectations and perceived resources

The above section shows that migration decisions tend to be adaptive and deliberate; however, the migrants do not always believe that they are in full control of their situation. Simply

put, migration is often not seen as a certain choice for a better life in the face of uncertainties and adversities involved in local climate and environment. For the villagers, migration decision-making involves a set of uncertainties and limited information about a wide range of factors – scope for farming, changing global markets and financial strain, besides environmental and climatic stresses and shocks. In this context, migration control beliefs comprise generalised expectations about the extent to which people think they can control events that affect them and the perceived resources available for migration. Locus of control denotes expectations about the extent to which people think they can control events that affect them (Rotter 1966; Leviston et al. 2011). An internal locus of control denotes people's expectation that they could be in control of their future.

Subjective or perceived adaptive capacity, or what an individual or a community thinks it can do, given the availability and access to resources, is as important as objective adaptive capacity, or what can actually be done (Grothmann and Patt 2005). Specifically, studies in the delta areas of Bangladesh have shown that a belief that disaster occurrence is in the hands of God does not prevent people from preparatory action (Alam and Collins 2010). A confirmation of an external locus of control among the respondents was the predominant agreement to the statement in the interview questionnaire (please see annex 1): "Many times I feel that I have little influence over the things that happen to me." A usually shared comment was variations of the notion that "God determines everything". The question is whether people feel in control of their destiny under such circumstances marked by uncertainty and do not feel as if they were mere pawns in the hands of fate. Interviews revealed a rather nuanced pattern of control beliefs. Many of those interviewed said that the success of household lies mostly determined by factors outside of their control, suggesting an external locus of control.

Most of the interviewees also agreed or strongly agreed to a related statement, "No matter what things I try to make a living in my village, the drought/flooding etc. prevents them from working." They tend to agree more or less with all the locus of control statements except the one that said despite short-term difficulties due to weather and commodity prices, an individual can stay ahead in the game. Only this result suggests an internal locus of control. However, in the context of adaptive action taken by the people—namely the wide basket of livelihood activities, different forms of migration and so on—it seems this sense of helpless does not prevent people from taking decisive action.

Migration control beliefs determine the way people make their decisions to stay put in their place or move out in the face of economic pressures in a background of multiple climatic and environmental hazards. A farmer in his mid-40s from Satkhira collecting forest produce, selling vegetables and grocery and migrating, also expressed similar sentiments. Three months after Cyclone Aila, he and his two sons migrated to Munshiganj, looking for wage labour. His father had sold his 33-decimal (0.3 acre) land to meet family expenses. "I tried many ways to become successful in different livelihood activities, but failed. Natural calamities are also a big reason for this failure along with human-made policies," he said. In the drought belt of Nawabganj, a migrant rickshaw-puller in his early 40s said: "Crops often failed in the drought season. My father was a sharecropper. However, due to lack of irrigation facilities he could not grow crops round the year. Over the years, he failed to pay his dues to the landowner, was burdened with debt, and then he started working as a day a labourer. I also do the same."

Even while narrating these stories of helplessness in the face of an uncertain climate, meagre resources, inadequate infrastructure and the lack of any social safety net, the respondents revealed the power of human agency in taking effective adaptive action such as migration. Mi-

gration is a choice they make in the face of adversities or opportunities. For a 30-year-old respondent in Munshiganj, leaving the farms in his flood-prone village to become a carpenter was clearly a choice for better earning. “My migration was driven by my desire to lead a better life, not by any natural calamities,” he said. In the way people frame the narrative of climate, environment and migration, the focus group discussions and interviews reveal a certain ‘can-do’ spirit, despite seemingly insurmountable obstacles. To put it concisely, the respondents see migration as an act of agency, a positive, planned move they take for a better livelihood. In this framing, migration is a not an act of helplessness by people faced with climatic and environmental stresses and shocks.

6.2.3 Migration personal norms: self-concept as opinion leader, perceived level of risk taking

Migration personal norms denote to what extent people believe that they are change-makers and opinion leaders, who take risks and innovative approaches. This section probes the migration decisions even further to see to what extent self-concept as an opinion leader and a risk taker influences migration decisions of the respondents. This a logical follow up of the last sub-section that conceptualizes migration as an act of agency.

The interviews showed that migration is a display of agency by villagers who wanted to earn more or offset losses suffered because of environmental changes. All the interviews suggest that it is the individual migrant who makes the migration decision. However, there were consultations with family members in the decision-making process, and support for migration came from extended family and friends as explained in detail in the following section. In the case of a 30-year-old man, his mother played a role in decision-making, and for a 25-year-old man, his father and brother contributed to the process. Two women interviewees said their husbands were the migrants and the two men took the decision to move.

Only five out of the 20 respondents considered themselves to be among the first in their area who have changed livelihood options, showing a level of pioneering spirit in the face of adversities or perceived inadequacies. A 32-year-old migrant in Nawabganj said that his father and ancestors were farmers, but after his homestead and farms were eroded, he moved to another village 23 km away. "As I do not have any land and farm work cannot be found all the time, I started working outside as a farm labourer, and later as a hawker in other districts of Bangladesh."

However, most of the interviewees did not consider themselves to be among the first to embrace change. A majority (11) of the respondents still said they were trying new livelihoods. Migration is not seen as a pioneering or risk-taking venture, but a business-as-usual activity despite all the uncertainties involved in it. The question whether they consider themselves as more risk-taking that other drew a blank or negative response from all participants except one. A 41-year-old landless labourer who used to cut and sell mangrove forest trees said: "Yes, it may bring fortune." He said he continued his father's trade and now has become a labour contractor.

At the same time, the respondents appreciated the risks and hardship involved in migration. Most of them said they could not take their family to their work destinations due to a variety of reasons including the temporary/seasonal nature of migrations, social commitments back home and possible exposure to risks. As a contractor who supplies labourers from his village to a brickfield in Satkhira district summed up the reasons for not taking his wife and two children with him: "It will be risky if we face any bad situation; social and religious practices; affection to village."

The narratives of migration also show that people test and tweak their methods on the basis of their own and their peers' experiences. Interviews suggest that it is usually informal net-

works that recruit and sustain migrants. As one of the respondents in Nawabganj narrated: "Before migration, there was no work in the village. I used to roam around here and there in search of livelihood… First, I went to Katapukar, another village… There I met a day labourer named Sadikul, who first told me about rickshaw pulling in Rajshahi." He also used to work as a seasonal rickshaw puller in Rajshahi. "Now I work 6 months in the village in the agricultural land and the rest of the time in Rajshahi." Most of the migrants (13) were "sometimes" consulted by others on issues regarding migration. One each was consulted "frequently" and "all the time". Five of them had "moderate" and three had "significant" influence over the livelihood practices, including the migration of others.

Together, these responses suggest that migration decisions are often made independently and the migrants are open to new livelihood options and moving to new places. Though migration is considered a "new" occupation as opposed to what the migrants' father and ancestors did, it is not considered a particularly risky or unique venture. Under the changed economic and environmental circumstances, there is a business-as-usual sense to migration despite the uncertainties involved in it. Migration appears to be a reliable option despite the uncertainties and a lack of any formal support by the government.

6.2.4 Social norm beliefs: sources of advice, traditions and cultural factors

Social norm beliefs explain the perceived trust in and influences of sources of advice, traditions and cultural factors. A social norm can be defined as "a rule governing an individual's behavior that third parties other than state agents diffusely enforce by means of social sanction" (Ellickson 2011: 3). Social norms are analysed in section to further understand influences involved in migration decision-making. If it is not primarily climatic and environmental factors or a spirit of risk-taking that drives migration, there are other factors at work here.

One such factor cited in the literature as explained in chapter 2 is social traditions and customs that legitimise migrations and support it.

It has been argued that the behaviour of one's peers, colleagues and family members influences one's identity and behaviour; people also learn to value something through their own experiences (Kinzig et al. 2013). Hunter and David (2011) argue that cultural-specific norms shape the ways in which households diversify livelihoods, including by migrating in a changing climate. These include gender norms and women often become disproportionately vulnerable to natural hazards due gender inequality and family responsibilities—factors that limit their mobility and survival options (Ahmad 2012).

In making livelihood choices, people put their trust in fellow households as the qualitative study has revealed. NGOs and the national government also enjoy their trust, but on a lesser level. Most of the respondents said that their decision to change their livelihood was influenced – "a little" (4 respondents), "moderately" (6) or "significantly" (2) – by the behaviour of their neighbouring households, friends or family. However, seven respondents said that there was no such influence. The migrants trust their social networks to inform them about opportunities and places to migrate. Usually when people go to work outside the village, family members, relatives or their friend share notes with them, and they take this as the primary source of information and advice. Interviews suggest that people trust these informal sources much more than government agencies and institutions.

The story that a widow in her mid-fifties from Munshiganj narrated weaves in this key role played by social networks in her son's migration abroad: "My son was unemployed and he was not interested in farming. Some of these friends from this village and outside have migrated abroad. He tried to convince me in different ways. However, due to financial constraints I could not agree with him. Later he came up one day with a sub-agent who facilitat-

ed migration of many people from this village. The sub-agent told me about a job abroad, salary and other benefits. Knowing everything, I went to my brother, who is financially in a better position, and asked for loan from him. He agreed to give me half of the migration cost. I also had a contact with an NGO in other village, who gave me one-third, and the rest of the money my son secured from one of these friends."

People depend on social networks for advice on livelihood activities as well. Regarding farming practices, 19 out of the 20 respondents declared "complete trust" and the remaining person "trust" in advice from their fellow households. Only half the respondents placed trust in information given by national and local governments on this matter. At the same time, 13 respondents said they were influenced by the behaviour of neighbouring households, friends and family in their decision to change their livelihoods; eight respondents said such influence only had a moderate effect, and one said it had a significant influence. Ethnic ties also often play a key role in facilitating migration. In Gabura, a woman in her mid-20s belonging to a minority ethnic group said that her husband was paid less that what his colleagues got — now he migrates to town with fellow villagers led by a labour contractor, all of them belonging to the same ethnic group.

Another culturally significant feature noticed in migration patterns is the prevalence of male migration. Often women and children cannot accompany male members of the family to migrant destinations. While it suggests that migration could often mean roughing it out in hostile environments, it also means that women prefer not to move to a new place without adequate facilities. At the same time, in some cases women prefer to stay back in risky home environments, especially after disasters such as cyclones (Mallick and Vogt 2012) to head households and take care of local livelihoods under trying circumstances. As the Gabura respondent belonging to the minority ethnic group narrated: "My husband is now working as a

seasonal migrant worker...His seasonal migration has turned into (a more frequent, but) temporary form immediately after Aila, with the closure of shrimp farms for two years and the restriction of government on pursuing livelihood in Sundarbans. He works in Jessore, Khulna, Gopalganj and Satkhira in the brick and paddy field. Like many other women (here) I catch small shrimp and crab from the river and sell them to small (retail) buyers."

These narratives of migration suggest that people follow their family members, peers, friends and community members while choosing their migration paths. Focus groups and semi-structured interviews showed that migrants placed a high degree of trust in information from their social networks while deciding where and when to go and what to do for a living (Massey et al. 1993). Usually, people who also work outside village, family members, relatives or their friends, provide information about migration. Mostly, resources for migration come from family members. In terms of social norm beliefs, the migrants trust members of their fellow households the most. Overall, socio-cultural norms and beliefs play a key role in making migration decisions. This finding has policy implications as it is word-of-mouth sharing of experiences among peers and relatives that often influence migration decisions, not formal institutions.

6.4 Discussion

Research into the climate change and migration nexus has often focussed solely on how people move in response to the impacts of variability and change in climate. This notion often ignores the nature of migration as a tried and tested livelihood choice amid a variety of socio-economic and environmental opportunities and limitations. This chapter closely looks at the behavioural aspects of migration decision-making in Bangladesh in the context of changes in its economy, and, increasingly, exposure to the impacts of climate variability and change.

The chapter traces the way migration decisions are made in the context of environmental change, including the impacts of climate variability and possibly change. Faced with dramatic changes, people are diversifying their livelihoods from farming and fishing that their ancestors practiced. They migrate to become shrimp cultivators, vegetable vendors, rickshaw pullers, street-sellers, casual labourers, contractors and factory workers. Depending on the availability of jobs, migrants often take up different roles, earning from a basket of livelihoods in any single year. Against a background of economic growth and reduction in farm livelihoods, villagers are confident about making use of the emerging opportunities in cities. They are positive about the efficacy of migrant labour as a way out of the limited job opportunities and sometimes losses suffered because of climate and environment-related stresses and shocks back home.

People see migration – in different patterns across time and space – usually as a strategy to diversify livelihoods. Sometimes migration is a coping strategy after a climatic or environmental shock. Households often diversify livelihoods by sending one or some of the household members away to work – for different durations – and thus reduce their vulnerability to shocks and stresses, including climatic ones. At the same time, the prevalent narrative about migration is all about improving income, and not necessarily escaping from a hostile environment, even when environmental stresses and shocks make livelihoods increasingly insecure and unsafe. In short, in a range of time–space combinations, migration contributes to such efforts, though migrants themselves do not call it adaptation.

In this context, migration decisions are often taken firmly and deliberately. Even when there are climate and environment-related threats, the decision-making process involves weighing the pros and cons of migration against other options such as diversifying livelihood activities at the home base. Though villagers tend to believe that the success of their household is most-

ly determined by factors outside their control, their creative and bold adaptive actions suggest that they have a sense of control over their destinies. Their belief that disaster occurrence is in the hands of God, however, does not prevent them from taking preparatory and remedial action. Still it may be noted that migration is not always possible or feasible to a variety of reasons, including lack of financial resources, family commitments and inadequate facilities and network at migrant destinations.

The research shows that villagers in areas particularly affected by increasing climatic stresses and shocks are diversifying their traditional livelihood strategies by migrating. Environmental factors, including climatic stresses and shocks, often make such shifts even more necessary. Although the migrants' primary motivation is better income, in effect, migration becomes an effective form of adaptation.

6.5 Chapter conclusion

Based on a qualitative study in three geographically distinct places of Bangladesh, this chapter proposes that migration is a socially acceptable behaviour that occurs in the context of perceived environmental change and climate variability. Migration decisions are mediated by a set of 'behavioural factors' that assess the efficacy of different responses to opportunities and challenges, their socio-cultural acceptance and the ability to respond successfully. This is because proactive action against natural hazards requires more than just risk awareness; it also involves helping people cross barriers to adaptive behaviour, and promoting social settings and environments that allow responsible action (Grothmann and Reusswig 2006).

A nuanced understanding of migration decision-making is particularly important considering the urgency for climate change adaptive action in Bangladesh. Firstly, climate extremes and even a series of non-extreme events are occurring against a background of social vulnerabilities and exposure to risks (IPCC 2012). While this trend continues, it is important to under-

stand, model, forecast and disseminate information on how the climate is varying and changing in the long term and how people are responding to such changes—by moving, staying or getting trapped. Secondly, the economic impacts of climate-related disasters on livelihoods continue to be huge. Entire stretches of land are still being eroded, salinised, flooded or kept fallow due to water shortage. People often have to move out of their place of origin for their safety and due to limited livelihood opportunities—but they also run the risk of a new set of hazards and uncertainties in their destinations. An understanding of the migration dynamics and patterns could help in planning for future development and resilience of migrants as well as their home and host communities. Thirdly, while migration works as an effective adaptation strategy to address both current and future environmental stresses and shocks, it is seen as a business-as-usual economic activity by most of the migrants. People in the study areas see migration as a way out of economic difficulties and expect environmental conditions to worsen in the coming decades, which means possibly more migration. If migration is an effective adaptation strategy, it is important to mainstream it into development, climate change and environment policies.

The next chapter tests how climate and environment-related hazards relate statistically with long-term migratory movements. Such a nuanced understanding of how environmental concerns influence internal and international migration has policy and development implications (Hugo 1996, World Bank 2010). While policy implications are discussed in Chapter 8.

7.

Quantitative analysis

Statistical analysis of factors that drive migration

The previous chapter has shown that in the three study districts of Bangladesh – Nawabganj, Munshiganj and Satkhira – villagers experience climate and environment-related stresses, shocks, and they are concerned about the risks they pose to their livelihoods and security. However, when people migrate, they rarely attribute their decision to move out of a place to experiences of hazards or risks perceptions. Instead, migration is seen more as a business-as-usual activity aimed at generating better income, offsetting losses or rebuilding after disasters. Climate and environment-related factors work in the background at best, without meriting an explicit acknowledgment. This chapter further explores such ambiguities involved in people's attribution of climate- and environment-related factors to their migration decisions. Based on field survey data, it develops a statistical model to explore how experiences of climate and environment-related stresses and shocks might influence migration – even if the respondents do not explicitly mention such a connection.

This chapter follows up on the evidence presented in the previous chapter, using survey data from Nawabganj, Munshiganj and Satkhira districts. While economic as well as climate and environment-related drivers work together in influencing migratory movements, it is not always clear from the qualitative inquiry how they interact with one another. A statistical model can help trace these different influences and their overlapping effect on migration. Using an event history analysis approach, this chapter builds a main logit model and a set of sup-

plementary models to understand the dynamics of climate- and environment-related migration. The assumption here is that the first migration influences subsequent movements. Therefore, the main models look at the respondent's first movement outside the district – irrespective of the destination. It tests the sensitivity of these movements to their environmental and climatic experiences and compares how these they compare with socio-economic factors that also influence migration.

The first part of this chapter spells the methods used for quantitative analysis in direct follow up of chapter 5. The second part gives a snapshot of the dataset and its characteristics. The third part looks at the models in detail and the fourth part summarises and discusses the results. With the aid of tables and graphics this chapter analyses how first movements –within and outside the district of origin – are influenced by various climatic and environmental experiences; and how migration trends differ when different socio-economic parameters are taken into account.

7.1 Methods explained

7.1.1 Introducing the regression model

To understand the factors behind first migrations in Bangladesh this thesis adopts a discrete event history model, analysing it using the statistical analysis software, Stata. Event history is a longitudinal record showing when a sample population experienced one or more events. Event history analysis is often used to study the duration until the occurrence of the event of interest. The duration is measured from the time at which an individual becomes exposed to the 'risk' of experiencing the event. A set of explanatory variables considered as potentially influencing the risk exposure. Two of its features, namely time varying variables as well as censoring, that is removing a subject after the event, make it difficult to be analysed using standard statistical procedures (Allison 1982, Steele 2004). Event history analysis methods can help identify causes of events.

In this research, the first migrations and the influences of socio-economic variables and the influence of a set of climate- and environment-related events are considered. It involves a person-year data structure and data censoring occurs due to first migration of the subjects. Event history analysis is well suited to analyse such data with such a design (Allison 1982). In line with the literature, binary and multinomial logistic regression methods are used to build discrete-time event history models (Henry et al 2004). The logit model comprising individuals at risk of migration can me expressed as:

$$\log\left(\frac{p(y_t = 1|x_{it})}{1 - p(y_{it} = 1|x_{it})}\right) = \alpha_t + xt\ \beta$$

Individuals at risk (of migration) have been include in a logit model in which $P(Y_{it}= 1|X_{it})$ is the probability that individual i experienced a first internal migration conditioned on a set of variables that took effect in a time span of t. The set of variables includes household and individual characteristics, experiences of climate- and environment-related hazards, concerns about these hazards and rainfall data. This set of variables includes time invariant and time varying variables. The baseline hazard function is α_t that is specified as the log of time spent in the risk set (simply put, time prior to the migration event occurring). The odds ratio can be written as the ratio of the probabilities that the migration event occurred to the probability that the migration event did not occur:

$$\frac{p(y_t = 1|x_{it})}{1 - p(y_{it} = 1|x_{it})} = e^{-xt\beta}$$

In event history analysis the hazard denotes the probability that an event occurs within a very small interval of time given that an event has not already occurred. Here the interval is a year. The data in this chapter has been transformed from odds to log of odds (log transfor-

mation). This is a monotonic transformation i.e., the greater the odds, the greater the log of odds and vice versa (Cooke et al 2013). In log of odds form – as used in this chapter – if the coefficient is positive then the factor of interest raises the hazard of the first internal migration occurring. A negative coefficient indicates that the factor reduces the hazard of first migration.

7.1.2 Selecting the variables

The literature suggests that a set of socioeconomic variables are expected to have an influence on the decision to migrate. Mainly they include gender, age, education, level of poverty, assets owned, social networks and family size. Women and men often have different migration behaviours mainly because of the different economic and social roles they play in the rural economy, and their job prospects in cities, as explained in chapter 2. The literature justifies disaggregation by gender to accommodate differences in migration patterns (for instance, Henry et al. 2004 and Henry and Dos Santos 2012). Climatic and environmental stresses and shocks – especially in the context of climate change – can affect women's and men's assets and well-being differently with regard to farm production, food security, health, water and energy resources, climate-related disasters and migration (Goh 2012). Social and cultural norms that determine gender roles and women's lack of ownership and control over assets make them more vulnerable as the literature shows (Goh 2012). Besides, men tend to explain their migration in terms of farming or financial needs, while women respond in terms of family reasons. The literature notes that in Bangladesh often seasonal or even long-term labour migration is a predominantly a male activity (Afsar 2003, Chowdhury et al. 2009, Mallick and Vogt 2012). Therefore, regressions have been carried out separately for men and women after building the common logit models that consider the research questions.

The main logit model, however, includes men and women, because migration comprises men and women and a true picture of its relationship with various socio-economic variables can be understood only in a common model. To a lesser extent, such a common approach makes sense because migration is often family activity, the different members or the whole family participating in it, supporting it or contributing to the migration decision-making process as the qualitative analysis has shown. Besides, the sample of inter-district migration is diluted with gender-based segregation possibly not capturing the whole picture of migration. To give an indication of different profile of migrant women hazard ratio and survival analysis graphs have been attached to supplement the main models. The separate, gender-based logit models are therefore given as supplementary data.

There are other socio-economic factors included in migration models in the literature. Age could be an important factor in determining migration. The literature suggests that migration decisions are influenced by the stage of life of the migrant when he or she moves. In Bangladesh, it is often younger people who migrate in search of work, as the qualitative research shows, and labour markets prefer younger recruits to older ones. The literature has found education as a key variable influencing migration in Bangladesh (Haque and Islam 2012). The rationale is that education opens up avenues, enhances skill sets and gives a broader worldview, thereby increasing the chances of getting the respondent a place in the labour market. As migration represents an effective risk mitigation strategy (Halliday 2008, Lueck 2011), when large family size often places more demand for resources and, therefore, often migration. On the contrary, sometimes family size can also act against migration due to the costs of travel. Family size and number of children in the family were, however, omitted from the final models. They did not show significance across regressions, and they did not provide consistent model results.

As for networks, migration of a family member allows pooling and reduction of risks. Similarly, the decision to migrate is more likely when individuals have migrant networks present in the destination (Garip 2008, de Haas 2010) and/or sufficient income to support their journey and meet the initial expenses at the destination. The qualitative analysis shows how migrants depend on their social networks for information, inspiration and financial support.

The literature shows that migration is often driven by the need for better income, to offset or minimise risks and to recover from losses (Stark and Levhari 1982, Stark 1984, Stark and Bloom 1985, Massey et al. 1993). Migrants look for rewards at their destinations (De Jong and Fawcett 1981), or an escape from disruptions or reduction in income (Stark and Levhari 1982). Migration still is often determined by socio-economic status (Wolpert 1965). Often a migrant's wealth, including money to undertake migration, influences his or her migration (Skeldon 1997). Among the socio-economic variables, one that is closely related to income is assets.

Along with income (expressed as poverty, or lack of sufficient finances) the number of assets have also been included as key socio-economic variables in this this analysis. Though people draw on natural, social, human, physical, and financial assets (de Haas 2008) for migration, the asset variable in this analaysis only represents the last two. The other aspects have considered under social networks and environmental and climatic variables. Migration literature places assets as an influencing factor in the unique combination that determines migration decisions (Kniveton et al., 2011, Black and Collyer 2014). However, it may be noted that poverty and assets can also have opposing impacts on migration, cancelling out the influence of each other. The literature shows that it is not always the poorest people who migrate (De Haas 2007). While assets aid migration, presence of assets can also work as a sign of afflu-

ence that makes migration unnecessary. Some people, under certain circumstances, may be too poor to migrate.

Climatic and environmental stresses and shocks appear to increase short-term rural to rural migration, but often does not affect, or even decrease long-distance moves. Henry et al. (2004), for instance, found that drought in Burkina Faso increases such short-distance moves while decreasing long-term, long-distance, mostly international moves. Often in Bangladesh, men often migrate in the event of a cyclone, leaving behind the family (Mallick and Vogt 2012). Such temporary migration of men might not count as shifting residence; however, cyclone-affected coastal regions show higher rates of migration compared with other parts of the country (BBS 2013). A large part of migration in Bangladesh also comprises people trying to escape seasonal deprivation (Chowdhury et al. 2009), especially from the northern drought belt, and to recover from the impacts of natural hazards (Hunter 2005; Penning-Rowsell et al. 2013). If these temporary moves do not involve a change of residence as such they are not captured by this analysis as explained in chapter 5 as part of limitations of the methods.

However, climatic and environmental hazards – such as cyclones, floods, and drought – do not necessarily make people move out or migrate in large numbers, except in the case of riverbank erosion or salinisation of farms (Gray and Mueller 2012, Penning Rowsell et al. 2013, Bohra-Mishra et al. 2014). While migration helps people cope with climatic and environmental stresses and shocks, literature also shows that disasters can sometimes reduce migration by cutting down resources needed to migrate or by increasing labour needs in the points of origin (Gray and Mueller 2012).

To address environmental factors as possible causal influences on migration, this analysis includes two distinct sets of variables: first, self-reported experiences of floods, cyclones,

erosion and droughts in each place of residence; and second, measured rainfall data obtained from meteorological stations in each location. Observed rainfall data from meteorological stations located in the three study districts (since 1981 till 2012, the survey year) were collected to measure the rainfall variability alongside the self-reported data other climate and environment related hazards. The literature suggests that there has been an increase in rainfall variability throughout the April-October season, and a shift in distribution, a reduction of overall rainfall and intense rainfall in October (Ahmad et al. 2012). Such variability disproportionately affects poor farmers with small land holdings, and fishers by changing flood patterns (Ahmad et al. 2012). As a proxy for rainfall variability, anomalies in rainfall have been taken as the variable for regressions. Besides, observed data on floods and cyclones, including the extent of flood area, its per centage, people affected, as well as cyclone wind speed, intensity and storm surge height, casualties and people affected were collected and tested for their correlation with migration.

7.1.3 Data quality control

Individual correlation tests were conducted for a set of socio-economic and climate- and environment-related variables selected from the survey. The quantitative survey questionnaire attached to this document as annex 2 gives a full list of the variables used in the survey. Based on the preliminary correlation tests, a set of variables that are correlated with migration are taken to build an event history model. Variables that show no correlation in the initial models, were dropped from the final model. Observed flood and cyclone data were dropped from the final model as they appeared to be too coarse to identify district-level migration trends. Concerns of risk posed by the above hazard experiences – as expressed in the qualitative analysis – were also tested for correlations. However, when incorporated into the models they appeared to be too nuanced to elicit consistent results across the sample population.

It may be noted that answers to question about risk concerns gave an indication of how people respond to risks in the qualitative part of the study.

Finally, the following socio-economic variables were included in all regressions reported in final model control for the various household characteristics that affect first migration: age at migration, education of the respondent, poverty while at the place of origin, number of assets owned at the place of origin, and family and friends outside the district of origin. The environmental variables considered were rainfall anomaly for each year of stay at the respondent's place of origin based on observed station data; and self-reported hazard experiences at the place of origin of the respondent, namely droughts, floods, riverbank erosion and cyclones.

An issue in estimating the regressions is unobserved heterogeneity referred to in the event history literature as frailty. Given that the data on individuals in the dataset are in panel form there might be unobservable factors determining their propensity to migrate. One way to control for frailty is by assuming that the data is normally distributed—this can be done by estimating a random effects logit. The random effects logit assumes that the unobserved heterogeneity is normally distributed and all estimates are conditional on this distribution of unobserved heterogeneity. All tables in the paper are based on a pooled logit whereby no assumptions have been made about the distribution of any unobserved heterogeneity present in the data.

Logistic regression could involve errors including measurement problems due to inaccuracy of the instruments used and the subjective nature of certain variables, such as self-reported information. Measurement error correction techniques have been suggested in the literature but most of them require to make certain assumptions on the involved variables, and usually it is very difficult to check whether these assumptions are satisfied, mainly because of the

lack of information about the unobservable and wrongly measured phenomenon. Therefore, to achieve better robustness in analysis, alternatives based on weaker assumptions on the variables may be preferable (Guolo 2008).

"One option to enhance robustness is variance–covariance matrix estimation (vce) corresponding to parameter estimates. The standard errors reported in the parameter estimates are the square root of the variances of the vce. Standard error of estimate is a measure denoting how much each data point on an average differs from the predicted data point. It is like the standard deviation of all the error scores and informs how much imprecision there is in the estimates calculated (Salkind 2010). This robust estimator of variance can relax the assumption of independence of the observations. In Stata it is noted by the vce (cluster id) option, producing "correct" standard errors (in the measurement sense), even if the observations are correlated. It specifies that the standard errors allow for intragroup correlation, relaxing the usual requirement that the observations be independent. That is, the observations are independent across groups (clusters) but not necessarily within groups. Clustvar specifies to which group each observation belongs, for example, vce (cluster id) as used in this chapter accounts of observations on individuals (StataCorp. 2015). Clustering produces valid inference whether or not heteroscedasticity or autocorrelation are problems (Wooldridge 2015).

In all regressions the baseline hazard was significantly different from zero and positive indicating positive duration dependence (the hazard increases with time). Besides, care has been taken to avoid multi-collinearity by introducing variables one by one in the model in a stepped manner, and isolating variables that might work together or cancel each other out. In the event of suspected multi-collinearity, alternative combinations were also included in the model to offset it.

Further, it may be noted that only about a fourth of the first movements of an individual were outside the district as the summary statistics show. Therefore, to test what exactly drives inter-district movement, and how an instance of inter-district migration varies from a shifting of house within the district, a separate logit model has been built comprising the first instance of house move irrespective of the destination. This model gives an indication of how the same socio-economic and climatic and environmental factors that determine the first inter-district migration influence the first house moving as well. This may be seen as an additional tier of analysis that gives more depth to the understanding of factors behind climate- and environment-related migration.

7.2 Descriptive statistics

As the objective of this quantitative analysis is to explore the relationship between migration and a set of socio-economic as well as climate- and environment-related variables, the key dependent variable modelled is first migration. Migration has several definitions in the literature. For this analysis, 'migration' is taken to mean any move that an individual makes from his district of origin. The initial movement from the district of origin is labelled here as 'first migration'. Subsequent migrations to other places have been excluded from the model, as migration is in part path-dependent, such that first migration might partly explain subsequent movements (Balaz and Williams, 2007). In the event history dataset used for logistic regressions, each year of the stay of a respondent in his first place of residence has been listed in a row. Each observation denotes a socio-economic condition or experience of one of the climate- and environment-related hazard, or rainfall condition based on actual station data.

Table 7.1 gives the basic details about the sample and its composition in terms of gender, location and district of origin.

Table 7.1 ***Respondents who have migrated outside their district of origin***

	Frequency	Per centage
Total sample size	1386	100
Non-migrants	633	45.67
Migrants	753	54.33
Women	464	33.48
Men	922	66.52
Migrant women	140	
Migrant men	613	
Sample after censoring out migration by respondents under 15	1317	
Migrants aged 15 or above*	686	
Female migrants aged 15 or above	128	
Male migrants aged 15 or above	558	
Sample size by interview venues		
Dhaka	184	31.28
Munshiganj	272	19.62
Khulna	179	12.91
Satkhira	293	21.14
Nawabganj	458	33.04
Sample size by district of origin		
Munshiganj	454	32.76
Satkhira	472	34.05
Nawabganj	460	33.19

** Logit model for inter-district migration excludes migrants below the age of 15*

Further, table 7.2 overleaf gives a break up of respondents by their district of origin and whether they have moved houses and their first move involved migration outside the district. It can be seen that the vast majority of the respondents (1202 out of 1386) have moved houses at least once.

Table 7.2 ***Respondents who have moved houses***

District of origin	Respondents	Non-movers	Movers	Move outside district
Munshiganj	454	8	446	80
Satkhira	472	103	369	109
Nawabganj	460	73	387	120
Total	**1386**	**184**	**1202**	**309**

Table 7.3 ***Migrants and non-migrants by their district of origin.***

District of origin	Non-migrants	Migrants
Munshiganj	238	216
Satkhira	207	265
Nawabganj	188	272

Table 7.4 shows the major first destinations of the respondents who have migrated out of their district. It may be noted that the destinations are big cities, topped by Dhaka, followed by Khulna, a coastal city.

Table 7.4 ***Major destinations of the migrants***

Destination district	Respondents
Dhaka	391
Khulna	201
Chittagong	23
Rajshahi	21
Jessore	17
Nawabganj	11
Other districts	90
All districts	**753**

Table 7.5 ***Socio-economic variables*** (and their assigned values in the logit models)

Educational achievement	
1	No Schooling
2	Junior School Cert.
3	Secondary School Cert.
4	Higher Secondary Cert.
5	Degree
1	No Schooling
Poverty level (*Availability of finances at the place of origin*)	
1	Always sufficient
2	Just sufficient
3	Often insufficient
Assets	
1	1-2 assets
2	3-4 assets
3	3-5 or more assets
Networks	
0 - 10	Number of friends and relatives outside the district of origin

7.3 Understanding the variables

Among the socio-economic variables, age has been taken at the time of migration as it is a key factor that include migration decisions. For migration outside the district, all the respondents who were less than 15 at the time of the migration have been excluded. This is to ensure that the model represents an act of migration undertaken by the respondent and not that the respondent has not accompanied a family member to a distant place. The term education indicates the total educational achievement of the respondent with values as indicated in table 7.5.

Table 7.6 ***Climatic and environmental variables*** (and their assigned values)

Negative anomaly	
0	No negative anomaly
1	Annual rain below 1 standard deviation (for 30 years observation)
2	Rain below 2 standard deviation
Positive anomaly	
0	No positive anomaly
1	Annual rain above 1 standard deviation (for 30 years observation)
2	Rain above 2 standard deviation
Normal rain	
0	Positive or negative anomaly
1	Normal rain
Drought	
0	No experience of drought at the place of origin
1	Experienced drought at the place of origin
Flooding	
0	No experience of flooding at the place of origin
1	Experienced flooding at the place of origin
Riverbank erosion	
0	No experience of riverbank erosion at the place of origin
1	Experienced riverbank erosion at the place of origin
Cyclone	
0	No experience of cyclone at the place of origin
1	Experienced cyclone at the place of origin

The self-reported climate- and environmental variables, drought, flooding, riverbank erosion and cyclone denote answers to the survey questions about experiences of these hazards during the respondent's stay at a particular place. Each variable is constant for the entire duration of a respondent's stay at one place in the dataset. So if a person stays in his village of origin for 20 years and he or she reports experiencing a cyclone, this experience is considered to be constant over the 20 years. It does not mean that the respondent has experienced cyclones over such a long period – but just that he or she experienced the hazards during the stay at the particular place. Capturing specific occurrences and their lasting impacts across long time span is difficult in a retrospective survey that depends on people's memories. However, the variable based on observed data, the rainfall anomaly, varies from year to year.

Logistic regressions incorporating all these variables – individually, one by one, as well as adding one after another in various combinations – shows the direction (positive or negative) and strength of the relationship between migration and climate and environment hazard experience and risk concern.

7.4 Analysis and findings

7.4.1 Main logit model – first migration outside the district

The main logit model A analyses the first migration outside the district against a set of socio-economic, climatic, and environmental variables. The table 7.7 overleaf describes the odds ratios in a logit model based on dummies for each year as is done in the literature (Henry et al. 2004). The coefficients denote the values for the logistic regression equation for predicting the dependent variable from the independent variable. The observations are in log-odds units. The t statistics associated with the coefficients are given in brackets.

Table 7. 7 ***Logit Model A: climatic and environmental variables that influence migration***

Model no.	**1** migration	**2** migration	**3** migration	**4** migration	**5** migration	**6** migration	**7** migration	**8** migration
Socio-economic variables								
Age at migration	-0.141***	-0.157***	-0.141***	-0.142***	-0.144***	-0.160***	-0.160***	-0.160***
	(-11.92)	(-11.67)	(-11.88)	(-11.77)	(-11.89)	(-11.83)	(-11.83)	(-11.83)
Level of education	0.213**	237**	0.204*	0.220**	0.222**	0.207*	0.212**	0.214**
	(2.60)	(2.98)	(2.47)	(2.64)	(2.71)	(2.50)	(2.58)	(2.59)
Poverty while at the place of origin	0.313*	0.246	0.316*	0.352*	0.380*	0.327*	0.314	*0.309*
	(1.98)	(1.52)	(2.00)	(2.25)	(2.46)	(2.05)	(1.93)	(1.90)
Assets owned at the place of origin	0.643***	0.636***	0.666***	0.711***	0.725***	0.794***	0.761***	0.762***
	(4.13)	(3.98)	(4.29)	(4.56)	(4.66)	(4.84)	(4.60)	(4.60)
Friends and relatives out-side the district of origin	0.508***	0.339***	0.508***	0.511***	0.485***	0.327***	0.333***	0.329***
	(6.00)	(3.95)	(5.92)	(6.00)	(5.81)	(3.84)	(3.92)	(3.88)
Hazard experiences at the place of origin								
Droughts	0.260	0.719***	0.184				0.259	0.253
	(1.24)	(3.38)	(-0.86)				(0.98)	(0.95)
Negative anomaly in rainfall (*station data*)		-0.104				-0.138		
		(-0.74)				(-1.06)		
Flooding			-0.182	-0.0946	-0.319	-0.562**	-0.508*	-0.510*
			(-0.88)	(-0.48)	(-1.55)	(-2.88)	(-2.51)	(-2.52)
Riverbank ero-sion				-0.509**	-0.521**	-0.579**	-460	-0.459
				(-2.82)	(-2.92)	(-3.16)	(-1.93)	(-1.89)
Cyclones					0.548**	-0.0281	0.0256	-0.00203
					(-2.85)	(-0.14)	(0.12)	(-0.01)
Positive anom-aly in rainfall (station data)							0.137*	
							(2.31)	
Normal rainfall (station data)								-0.439***
								(-4.46)
_cons	2.133***	2.628***	2.285***	2.439***	2.445***	3.469***	3.238***	3.306***
	(3.57)	(4.38)	(-3.67)	(3.75)	(3.75)	(5.33)	(4.95)	(5.04)
N	28066	22437	28066	22437	28066	22437	22437	22437
adj. R-sq								

*(t statistics in parentheses * p<0.05, ** p<0.01, *** p<0.001)*

The table shows that the older the respondent the lesser he or she is likely to migrate out of the district. In all the regression models (1-8) that incorporate various climatic and environmental hazards, age is a highly significant ($p<0.001$) factor that negatively influences migration. Education appears to be a very significant ($p<0.01$) factor that drives migration in models 1- 2, 4 –5 and 7 – 8; it is still significant ($p<0.05$) in the remaining two models. Poverty levels also appear to positively influence migration significantly in models 1 and 3 – 6. The total number of assets appear to have an even more significant positive influence on migration in all the models – so does the number of networks or family and friends outside the district of origin. These two variable show highly significant results across all the models.

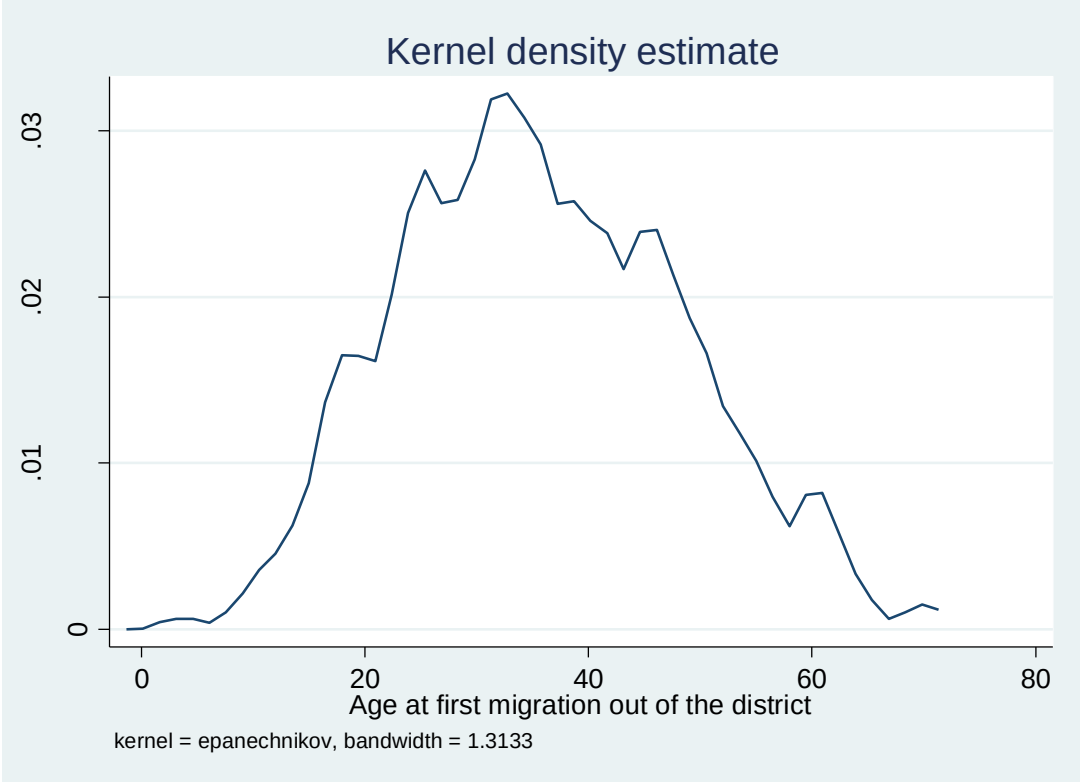
Among the climate- and environment-related variables, experience of drought appears to be a highly significant variable that drives migration in model 2 that incorporates negative anomaly in rainfall. In itself negative anomaly in rainfall does not become a highly significant variable, though positive anomaly in rainfall tends to drive migration in a significant relationship (model 7). However, normal rainfall has a highly significant negative influence on migration as model 8 shows. Experience of flood becomes a very significant variable in model 6 and significant in models 7 – 8, negatively influencing migration. Erosion of riverbanks also appear to influence migration negatively in a very significant manner as models 4 – 6 show. Cyclones appear to have a very significant positive influence on migration outside the district that incorporates floods and riverbank erosion as model 5 shows. However, this influence appears to diminish in other models. Riverbank erosion appears to negatively influence migration in all the model.

7.4.2 Graphic representation of the main logit model using kernel density estimate graphs

It may be noted that the way age at migration is distributed in the dataset is not as if it is in a straight-line graph. Besides, there are district-wise variations in migration patterns. Kernel

density estimations show this as a more nuanced picture. Kernel density is a non-parametric density estimator that takes into account all the data points in analysis time to reach an estimate. It works as an interpolation technique for showing individual points in time (Silverman 1986). Density of a continuous random variable describes its relative likelihood be assigned a given value. Here the distribution is estimated by summing the individual kernel functions at different points in time to produce a smooth graph, each point contributing equally to a smoothing probability density graph (Levine 2010).

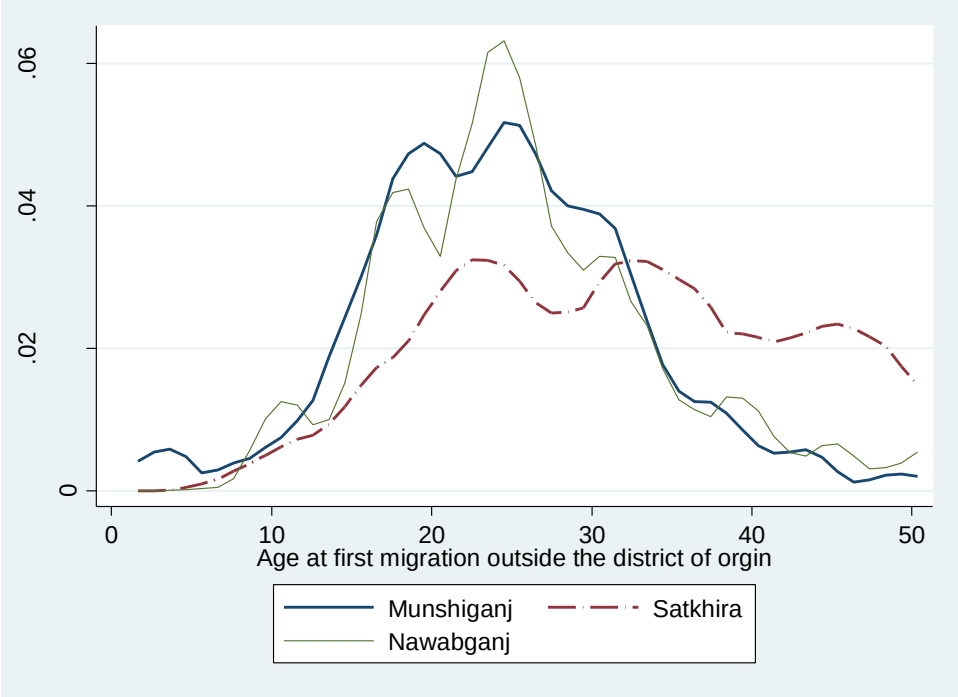
Figure 7.1 ***Kernel density graph showing the probability of first migration by age***



The highest probability of migration is for people in their early 30s.

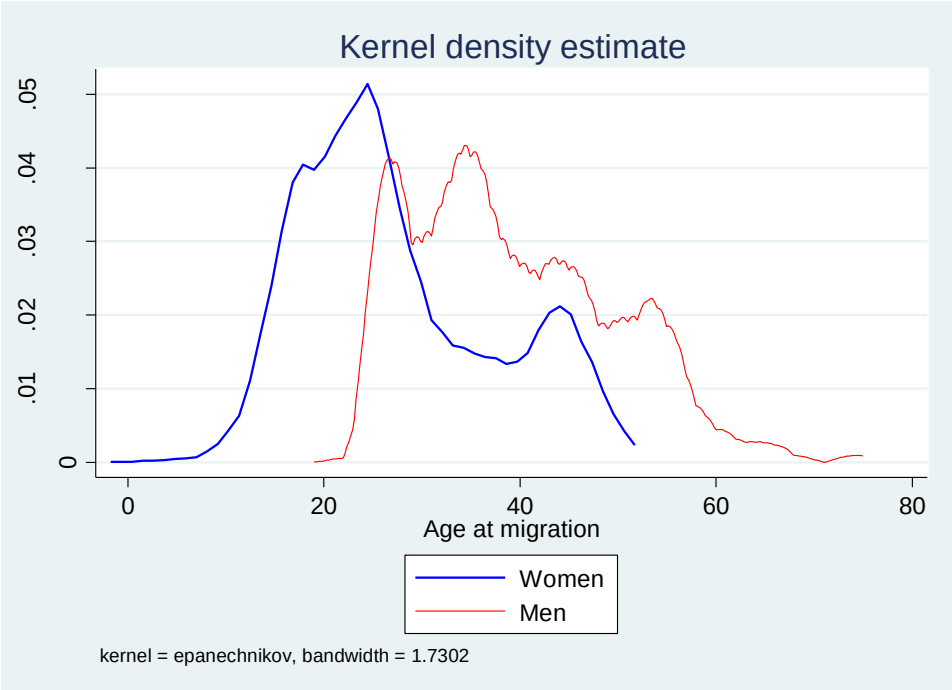
As the graphs show, the highest probability of migrations, it appears, is when the migrant is in his or her 30s. Though this can be interpreted as the peak probability period, there are also district-wise differences in this trend as figure 7.2 shows and they include the probability of migration at an earlier or later period. There are also differences in the probability of men and women migration as well. The following figure 7.3 shows this.

Figure 7.2 ***Kernel density graph showing first migration by age and district***



Nawabganj and Munshiganj districts show migration by teenagers, while people in their 40s appear to be migrating from Satkhira

Figure 7.3 ***Kernel density graph showing the age of women and men migrating***

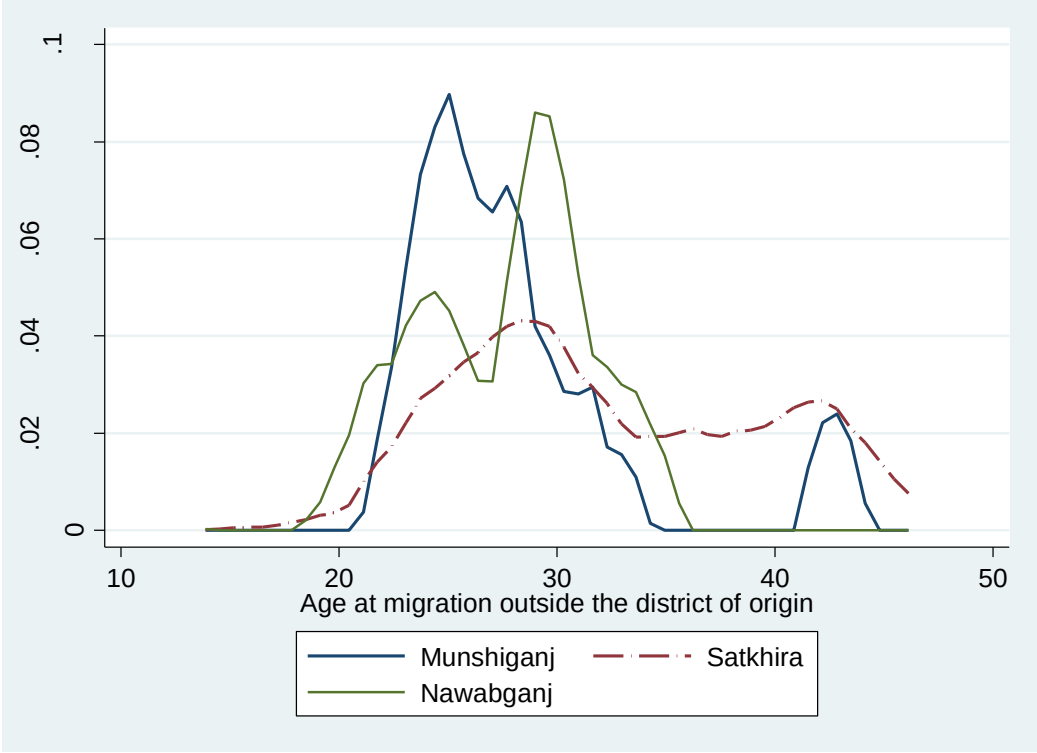


There seems to be higher probability of women migrating at an earlier age compared with men.

While men and women are the most likely to migrate in their early 20s, there seems to be higher probability of women migrating at an earlier age compared with men, and they tend to be more likely to stop migrating in their late 20s. However, migration of women in their late teens is a phenomenon noticed only in the drought-prone Nawabganj district as figure 7.4 shows. This could be due to a linkage between drought and migration (Findlay and Geddes 2011, Etzold et al. 2013). Logit Model A (table 7.7) shows that droughts have a highly significant influence on inter-district migration. Across the study areas, one possible explanation for early migration of women is marriage, because women are usually expected to move to their husband's place as the tradition in most parts of Bangladesh mandates. Marriage appears to influene women's migration as correlation tests show.

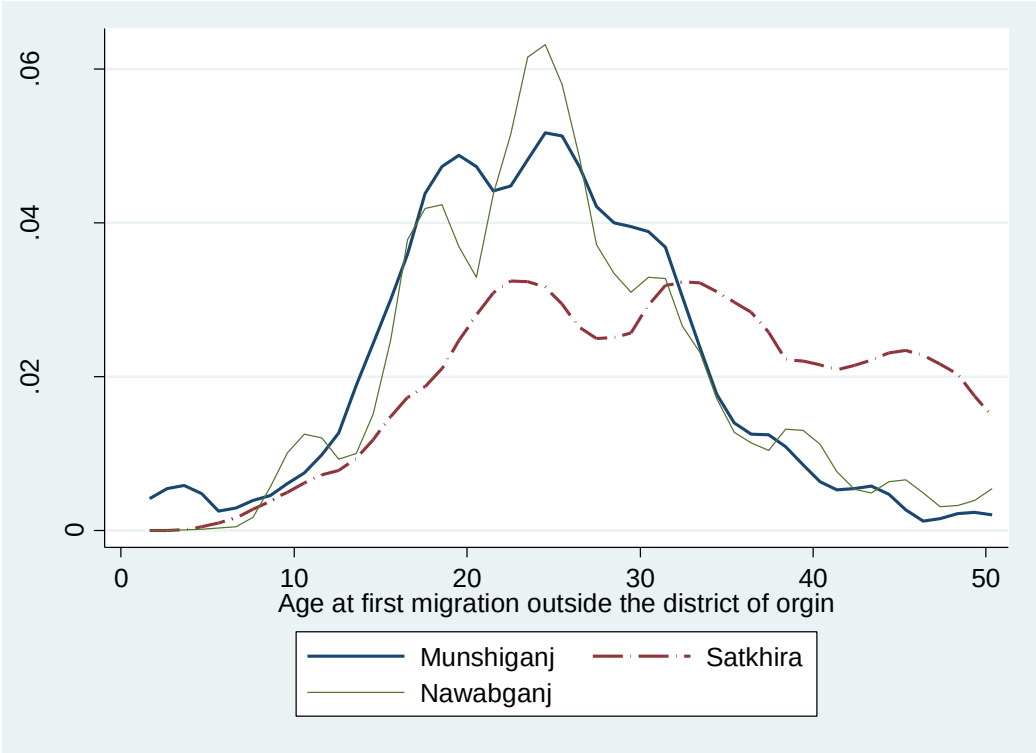
The probability of men's migration tends to peak in their early 20s, and mid 30s. There is high probability (though not as high as in the case of younger respondents) of men and women migrating in their 40s and later. However, as the figure 7.2 as well as graphs 7.4 and 7. 5 overleaf show, such later age migration is found mainly in Satkhira, the cyclone prone district. The literature as well as qualitative analysis shows evidence for inter-district migration of affected by the last two major cyclones, namely Sidr (2007) and Aila (2009).

Figure 7.4 Kernel ***density graph showing the age of women migrating, by district***



Trends suggest that women in their 40s seem to be migrating from Satkhira

Figure 7.5 Kernel ***density graph showing the age of men migrating, by district***



Trends suggest that men in their 40s seem to be migrating from Satkhira

The kernel density estimate graphs show that there are differences along district lines in the migration patterns of men and women. The probability of migration peaking at early or late 20s is largely a phenomenon in Munshiganj and Nawabganj; whereas migration from Satkhira appears to continue in a smoother curve as men and women get older. This trends points at the possibility that migration from Munshiganj and Nawabganj involves mostly young people driven more by income needs, whereas those who leave Satkhira include people more settled in life, possibly leaving the district after the impacts of recent cyclones. Census trends show trends (BBS 2012) of slow population growth in the coastal areas, suggesting migration away from the coasts (Marshall and Rahman 2013).

Analysis of census data show that coastal divisions of Barisal and Khulna (that includes Satkhira district) have shown population growth well below the national average, suggesting large-scale outmigration, especially during 2001 - 2011 (BBS 2013, Marshall and Rahman 2013). While environmental stresses and shocks are a possible reason for such migration generally weak economic growth of the coastal region also contributes to these outflows (Marshall and Rahman 2013).

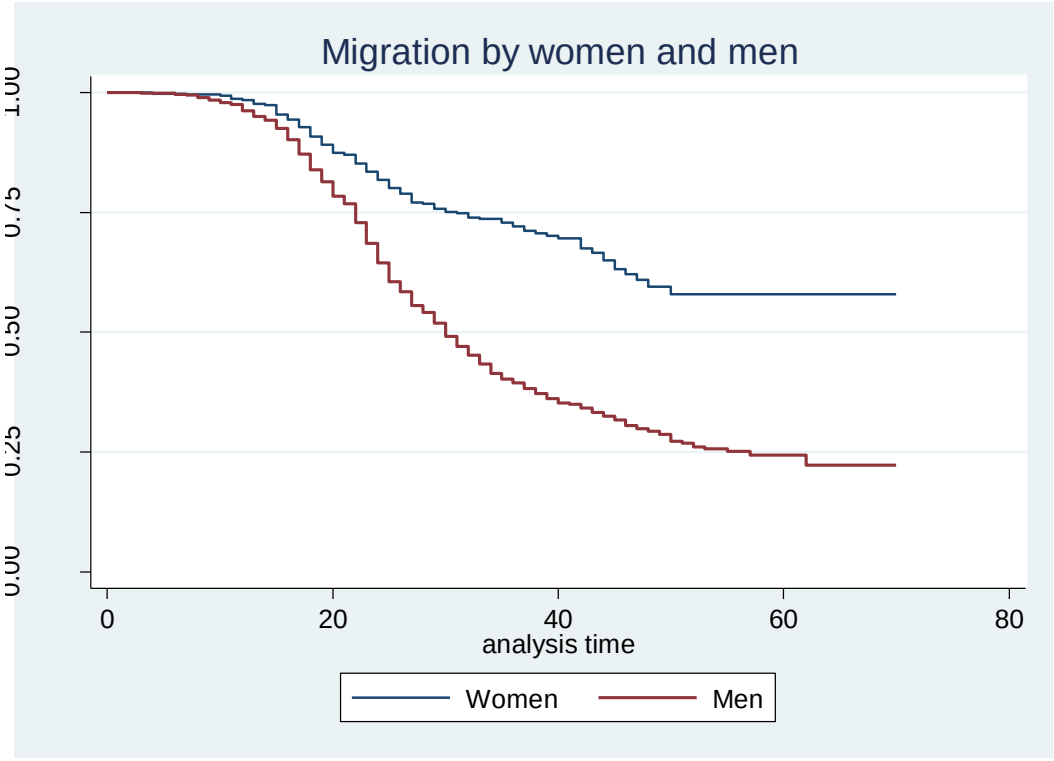
As noted in chapter 3, studies show that migrants from the coastal belt and the northern Monga-effected districts (that includes Nawabganj) comprise a sizeable share of slum dwellers in Dhaka. This has been the trend even before the 2007 and 2009 cyclone. As a Centre for Urban Studies survey done in 2005 noted, people from coastal areas accounted for 31.9 per cent and Monga-effected northern districts 4.6 per cent of Dhaka slum dwellers (Marshal and Rahman 2013). The northern districts do not show such dramatic outmigration as the coastal districts (BBS 2013). Possibly a part of the migration comprises seasonal migration, that is not captured in this analysis. It appears that cyclone events, their lingering impacts such as

soil salinity, the perception of future cyclone risk and the general economic backwardness of the coastal region have together shaped the migration decisions of people in Satkhira.

7.4.3 Graphic representation of the main logit model using Kaplan-Meir graphs

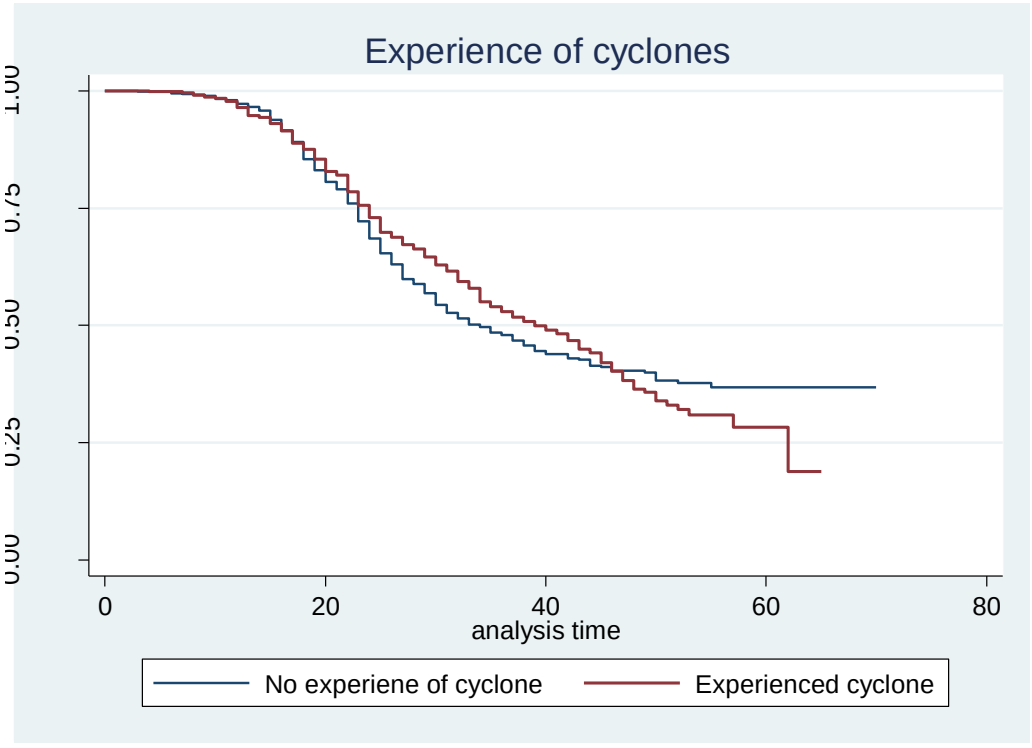
The migration trends are further illustrated in the separate models for men and women attached later in this chapter. In a Kaplan-Meier survival analysis graph, each subject has three variables – the serial time, status at the end of the serial time (event occurrence/ or censoring), and the group they are in. The horizontal lines along the serial time indicate the survival duration. The interval ends at the occurrence of the event – in this case migration. The vertical distances between horizontal lines show the change in cumulative probability as the curve moves along the event time. Kaplan-Meier curves are non-continuous, so they do not look smooth unlike kernel density estimates, but step-wise estimates (Rich et al. 2010). In the examples below, the cumulative probability of surviving (not migrating out of the district or origin, even which changing houses within the district) during a given time is seen on the Y-axis. The steepness of the curve is determined by the survival durations shown as length of horizontal lines.

Figure 7.6 ***Kaplan-Meir survival graph showing migration of women and men***



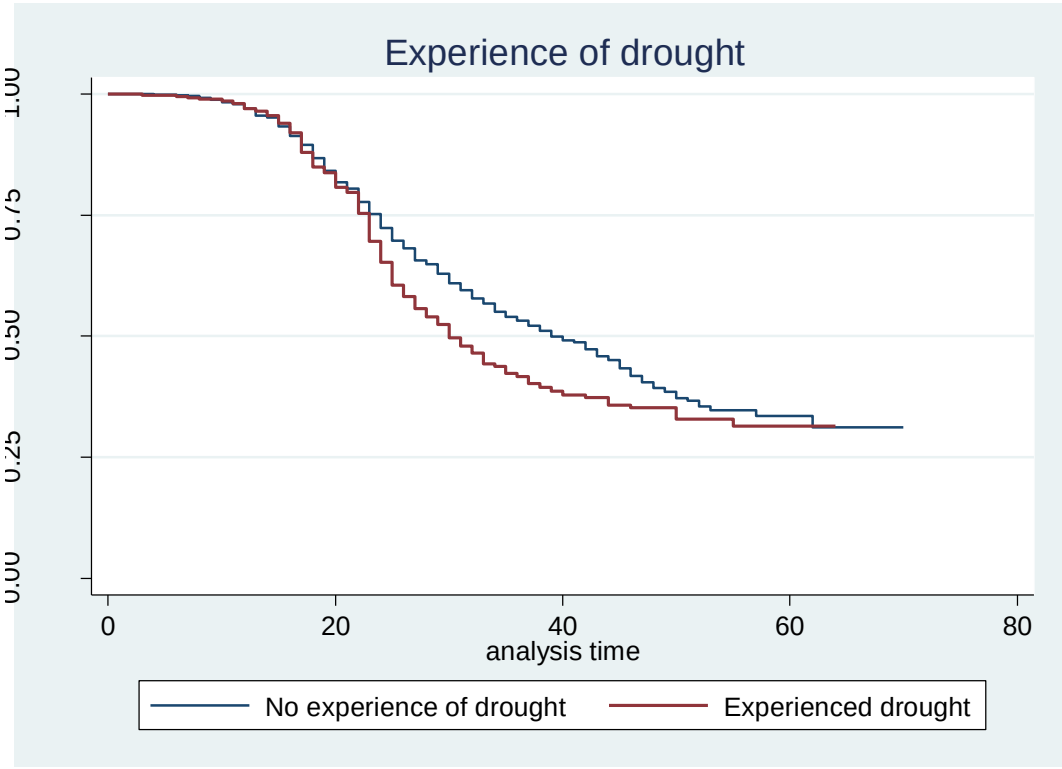
Men tend to have lower levels of survival (that means migrate more) than women

Figure 7.7 ***Kaplan-Meir survival graph showing migration with relation to cyclones***



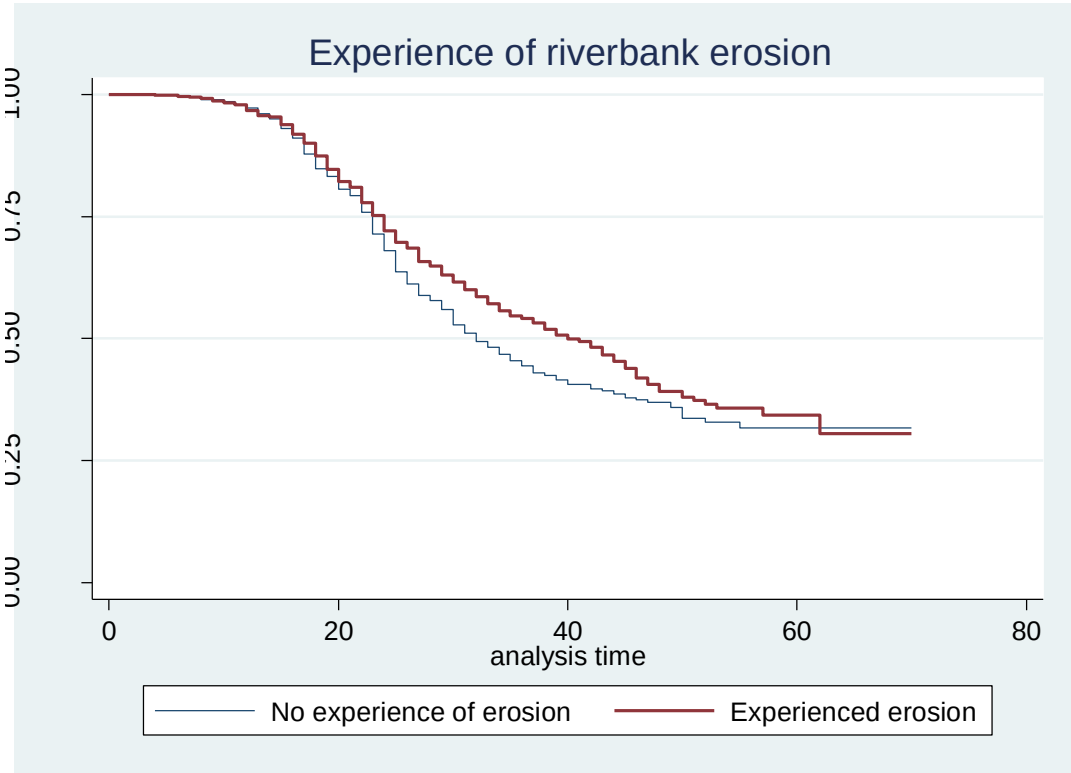
Experience of cyclones shows mixed influence on migration

Figure 7.8 ***Kaplan-Meir survival graph showing migration with relation to droughts***



Experience of drought appears to increase migration

Figure 7.9 ***Kaplan-Meir survival graph showing migration with relation to riverbank erosion***



Experience of riverbank erosion appears to decrease migration

Men tend to have lower levels of survival (that means migrate more) than women. As for climatic and environmental variables, while droughts appear to drive migration, and erosion discourages migration, cyclones show a mixed influence. While in early years it drives migration, the trend reverses from the 20^{th} year onwards, but picks up again after early 40s. Such a mixed pattern is shown clearly in the kernel density graph showing migration patterns of men in the cyclone affected district Satkhira.

7.4.5 Supplementary models showing differences in first migration among men and women

As discussed above socio-economic and environmental variables work differently in migration of men and women. Though the whole picture of migration requires to take into account migration by all adults, it may be worthwhile examining how the influences being analysed in this chapter work exclusively on men, women and together in a combined manner. The following models show analysis disaggregated along gender lines.

Table 7.8 ***Logit Model A-m: First migration of men out of the district of origin***

Model no	**1** migration	**2** migration	**3** migration	**4** migration	**5** migration	**6** migration	**7** migration	**8** migration
Socio-economic & demographic variables								
Age at migration	-0.157***	-0.166***	-0.157***	-0.157***	-0.158***	-0.165***	-0.165***	-0.165***
	(-11.61)	(-11.09)	(-11.66)	(-11.79)	(-11.87)	(-11.25)	(-11.11)	(-11.10)
Level of education	0.0593	0.0821	0.0699	0.104	0.102	0.0963	0.0974	0.0980
	(0.58)	(0.82)	(0.69)	(0.99)	(0.97)	(0.92)	(0.94)	(0.94)
Poverty while at the place of origin	0.215	0.224	0.213	0.246	0.281	0.249	0.250	0.247
	(1.05)	(1.11)	(1.04)	(1.19)	(1.39)	(1.21)	(1.22)	(1.20)
Assets owned at the place of origin	0.333	0.342	0.306	0.306	0.280	0.354	0.354	0.355
	(1.62)	(1.78)	(1.49)	(1.48)	(1.36)	(1.73)	(1.73)	(1.74)
Friends & relatives outside the district of origin	0.412***	0.263*	0.413***	0.422***	0.404***	0.270*	0.272*	0.268*
	(3.32)	(2.26)	(3.37)	(3.46)	(3.33)	(2.32)	(2.33)	(2.30)
Hazard experiences at the place of origin								
Droughts	0.404	0.725**	0.482*				0.183	0.183
	(1.67)	(2.86)	(2.00)				(0.53)	(0.53)
Negative anomaly in rainfall (*station data*)		-0.151				-0.145		
		(-0.84)				(-0.86)		
Flooding			0.180	0.318	0.123	-0.00115	0.0279	0.02
			(0.70)	(1.23)	(0.44)	(-0.00)	(0.11)	(0.10)
Riverbank erosion				-0.865***	-0.857***	-0.841***	-0.731*	-0.721*
				(-3.49)	(-3.47)	(-3.41)	(-2.11)	(-2.08)
Cyclones					0.422	-0.0928	-0.0635	-0.0831
					(1.57)	(-0.33)	(-0.23)	(-0.30)
Positive anomaly in rainfall (station data)							0.100	
							(1.50)	
Normal rainfall (station data)								-0.376**
								(-3.16)
_cons	4.118***	4.266***	3.987***	4.429***	4.415***	4.879***	4.693***	4.746***
	(5.58)	(5.59)	(5.48)	(5.88)	(5.90)	(6.07)	(5.88)	(5.94)
N	17562	13613	17562	17562	17562	13613	13613	13613
adj. R-sq								

*(t statistics in parentheses * p<0.05, ** p<0.01, *** p<0.001)*

Table 7.9 ***Logit Model A-w: First migration of women out of the district of origin***

Model no.	**1** migration	**2** migration	**3** migration	**4** migration	**5** migration	**6** migration	**7** migration	**8** migration
Socioeconomic variables								
Age at migration	-0.130***	-0.204***	-0.130***	-0.126***	-0.134***	-0.210***	-0.211***	-0.210***
	(-5.47)	(-4.22)	(-5.47)	(-5.14)	(-5.78)	(-4.42)	(-4.37)	(-4.37)
Level of education	0.224	-0.0448	0.224	0.223	0.286	-0.0851	-0.0796	-0.0792
	(0.94)	(-0.31)	(0.94)	(0.96)	(1.34)	(-0.53)	(-0.48)	(-0.48)
Poverty while at the place of origin	0.641*	0.337	0.640*	0.664*	0.739*	0.534	0.530	0.526
	(2.26)	(1.24)	(2.24)	(2.31)	(2.45)	(1.96)	(1.92)	(1.90)
Assets owned at the place of origin	0.0706	-0.189	0.0660	0.0879	0.368	0.298	0.249	0.248
	(0.19)	(-0.46)	(0.18)	(0.26)	(1.12)	(0.83)	(0.59)	(0.58)
Friends and relative outside the district of origin	0.818***	0.722***	0.818***	0.836***	0.792***	0.682***	0.685***	0.684***
	(5.84)	(4.12)	(5.87)	(6.13)	(5.84)	(4.17)	(4.19)	(4.19)
Hazard experiences at the place of origin								
Droughts	-0.415	0.730	-0.404				0.175	0.161
	-1.12)	(1.70)	(-1.07)				(0.36)	(0.33)
Negative anomaly in rainfall (*station data*)		-0.223*				-0.177		
		(-2.02)				(-1.92)		
Flooding			0.0253	0.378	-0.114	-0.652	-0.601	-0.603
			(0.07)	(0.94)	(-0.27)	(-1.52)	(-1.40)	(-1.40)
Riverbank erosion				-0.635	-0.742*	-1.007*	-0.962*	-0.952*
				(-1.85)	(-2.15)	(-2.31)	(-1.99)	(-1.97)
Cyclones					1.311***	0.278	0.327	0.306
					(3.70)	(0.65)	(0.75)	(0.70)
Positive anomaly in rainfall (station data)							0.00810	
							(0.06)	
Normal rainfall (station data)								-0.553*
								(-1.98)
_cons	-0.577	2.391	-0.595	-0.869	-1.135	3.183	3.051	3.083
	(-0.47)	(1.35)	(-0.48)	(-0.64)	(-0.84)	(1.70)	(1.66)	(1.68)
N	10504	8824	10504	10504	10504	8824	8824	8824
adj. R-sq								

*(t statistics in parentheses * p<0.05, ** p<0.01, *** p<0.001)*

The gender-disaggregated models Logit Models A-m and A-w show differences on how socio-economic, climatic and environmental variables influence migration. The strongest common influences on migration in the men's and women's models appear to be age, showing a highly significant negative correlation across all models, and social networks showing high significance as a positive influence in all women's models and the first five (1-5) men's models (1-5). Riverbank erosion comes across as a strong negative influence in three of the men's models (1-3), attaining more influence than in the main model. The experience of cyclone also appears to be a highly significant influence, only one women's model (as in the main model, but with added significance). Assets, a highly significant positive influence in the main model appears to have lost its significance in the men's and women's models. However, poverty retains its significance only in the first three women's models (1-3) at the same level as in the main model (1-6).

7.4.6 Supplementary logit model – moving house for the first time

As most of the respondents (about 87 per cent) have moved house at least once, and most of their movements (as much as 74 per cent) were within the district, it may be worthwhile to look at what drives such shifts, and how they are related.

TABLE 7.10 ***Logit model B– first instance of moving house***

Model no	**1** move	**2** move	**3** move	**4** move	**5** move	**6** move	**7** move	
Socio-economic & demographic variables								
Age at migration	-0.152***	-0.169***	-0.151***	-0.154***	-0.151***	-0.169***	-0.168***	-0.168***
	(-14.53)	(-13.69)	(-14.39)	(-14.15)	(-13.92)	(-13.70)	(-13.44)	(-13.47)
Level of education	-0.230*	-0.214*	-0.231*	-0.238*	-0.257*	-0.269*	-0.269*	-0.267*
	(-2.36)	(-2.14)	(-2.35)	(-2.41)	(-2.57)	(-2.52)	(-2.52)	(-2.51)
Poverty while at the place of origin	0.309	0.277	0.343	0.340	0.326	0.218	0.230	0.230
	(1.57)	(1.37)	(1.73)	(1.73)	(1.64)	(1.03)	(1.08)	(1.08)
Assets owned at the place of origin	0.106	0.207	0.161	0.145	0.186	0.35	0.348	0.348
	(0.57)	-1.09	(0.86)	(0.77)	-0.99	-1.77	-1.75	(1.75)
Friends & relatives outside the district of origin	0.502***	0.347*	0.515***	0.528***	0.588***	0.445**	0.445**	0.444**
	(3.73)	(-2.34)	(3.84)	(3.99)	(-4.3)	(-2.83)	(-2.84)	(-2.83)
Hazard experiences at the place of origin								
Droughts	-0.494*	-0.0903	-0.771***				-0.222	-0.221
	(-2.32)	(-0.40)	(-3.32)				(-0.63)	(-0.62)
Negative anomaly in rainfall (*station data*)		0.124***				0.0598*		
		(-4.27)				(-2.33)		
Flooding			-0.657**	-0.535*	-0.0979	-0.292	-0.324	-0.324
			(-2.60)	(-2.23)	(-0.34)	(-1.01)	(-1.12)	(-1.12)
Riverbank erosion				0.600**	0.734**	0.722**	0.578	0.59
				(2.65)	(3.12)	(2.93)	(1.72)	(1.76)
Cyclones					-0.809**	-1.056***	-1.048***	-1.072***
					(-2.86)	(-3.53)	(-3.41)	(-3.48)
Positive anomaly in rainfall (station data)							0.258***	
							(5.83)	
Normal rainfall (station data)								0.589***
								(4.63)
_cons	5.098***	5.256***	5.485***	4.913***	4.794***	5.510***	5.579***	5.633***
	(7.41)	(7.02)	(7.82)	(7.28)	(7.17)	(7.01)	(6.92)	(6.99)
N	31394	20354	31394	31394	31394	20354	20354	20354
adj. R-sq								

*(t statistics in parentheses * p<0.05, ** p<0.01, *** p<0.001)*

Similar to the main migration model, the model of house shifts (largely withing the district) shows the older the respondent he or she is less likely to move house. In all the regression models (1-8) age at the time of moving house remains a highly significant factor. The number of social networks (friends and family), however, is a highly significant positive influence acorss the first five models (1-5) as in the main model, but loses a degree of significance in the rest (5-6).

Cyclones, appear to have a highly significant (models 6 –8) negative influence over house shifts – this is contrary to what has been see in long-distance migration. Drought when combined with negative rainfall anomaly becomes a highly significant factor that negatively influences house shift in one of the models – it is the opposite of what is seen in one of the main models. Negative rainfall anomaly tends to drive movement with a highly significant influence in one of the models (model 2). Experience of floods tend to discourage movement with a very significant (model 3) or significant (model 4) influence.

7.5 Discussion

7.5.1. Lessons from the main model

The results suggest that climate- and environment-related hazards influence migration often works in non-liner and indirect ways. They sometimes do not necessarily drive migration; on the contrary, sometimes they appear to hinder migration. Most of the time they work in combination with socio-economic variables that can be considered primary drivers of migration – they include age of the migrant, poverty levels, assets, networks and education. The logistic regression models described above show varying levels of such influences and how they change in the presence of various climate- and environment-related variables – and the choice and distance of migration destination.

The observations in general in the main Logit Model A appear to be in line with literature mentioned in section and in the chapters 2 and 3. The Model shows that migration out of the district is an age-dependent, poverty-driven activity, strongly supported by social networks. However, people who migrate are those who have some assets that they could use to cover the costs involved, not necessarily the poorest in the village. Chronic exposure to drought makes people highly prone to inter-district migration, possibly in search of city-based livelihoods. It may be noted that the top destinations of the inter-district migrants are big urban centres, namely, Dhaka, Khulna, Chittagong, Rajshahi and Jessore. However, normal rain appears to discourage migration in a highly significant manner. It could be argued that especially in chronically drought-affected places, normal rainfall comes as a blessing that offers the prospect of good crops, encouraging people to stay back. Floods and riverbank erosion tend to discourage migration. This could be due to a sudden shock that reduces resources to migration. As such, the literature suggests that flood-induced movements tend to be short-term and short-distance, and erosion-related displacement tend to involved short distances, though it could be for a long duration. However, this aspect needs deeper probe to understand the underlying dynamics. Cyclones tend to drive migration outside the district as the literature suggests.

In short, migration appears to be driven by the need for better income, and people with better assets, education and networks are better placed to migrate outside the district. Positive environmental events such as a normal rain or shocks such as flood or riverbank erosion could discourage migration. At the same time more dramatic – and potentially more devastative events – such as cyclones could drive migration outside the district.

7.5.2 Differences along gender lines

The different trends observed show that men's and women's migration patterns show that influences of socio-economic, climatic and environmental factors differ across gender lines. Among the socio-economic variables, men's and women's models retain the high significance of age and social networks that influence migration in negative and positive manner respectively. While poverty and assets retain the same positive relationship to migration, they have lost their significance in men. Poverty retains its significance as in the main logit models (models 1, 3-5, but not in 6).

The results may be interpreted as while it is young men and women with education who are more likely to migrate, income needs drive migration of women more significantly compared with men. This could mean that insufficient income is a strong motive for family migration or migration of women. The only climatic hazard that has a (highly) significant positive influence on women's migration is cyclone. It appears that women and families seems to be moving out of cyclone- affected areas, as figures 7.2, 7.4 and 7.5 (that show general, men's and women's migration from the cyclone-prone Satkhira) shows. This aspect is further discussed with comparisons with the literature in chapter 9. Meanwhile riverbank erosion, normal rainfall, and even a negative anomaly in rainfall appear to have a negative influence on women's (long-distance) migration. The relationship of rainfall anomalies with women's migration has been discussed in sub-section 7.4.6. An inverse relationship between negative rainfall anomaly and migration could mean that families or women do not move out in a year of bad rain.

Some of the variables gain significance only in the main model. Assets appear not to have significant influence on men's or women's migration as gender disaggregated models show. (Assets positively influence migration in a highly significant manner in the main models.) It looks like a case of sum total significance becoming greater than the significance shown by

the two components, namely women's and men's migration. The negative influence of flooding is another variable that has lost its significance in the separate models. The reason could be almost halving of the sample size. When the sample is divided the regressions tend to lose statistical significance. Estimating separate models for each group can result in loss of statistical power, i.e. it may be less likely to reject the null hypothesis (Williams 2015). It just means that the analysis loses degrees of freedom with reduced sample size in the regression, not that any of the analyses were incorrect.

7.5.3 Comparing with moving house

In general, Logit Model B shows that a set of socio-economic factors as well as climatic and environmental factors highly influence the first instance of moving house. However, these influences are somewhat different from those that influence the first migration out of the district. The highly significant negative influence of age shows a trend similar to that of Logit Model A. However, changing house appear to be driven by poverty, but not aided by ownership of more assets as inter-district migration is. Networks appear to be highly significant – as much as in inter-district migration – in determining shifting houses. This predominant influence of poverty and networks in the first instance of moving house – that can be counted as short-distance internal migration –is in line with the literature as explained above.

Experience of droughts and floods appear to discourage moving house to some extent, and cyclones tend to have an even stronger hindering effect with consistently very/ highly significant negative relationship with movement. It may be inferred that people are probably incapacitated by exposure to hazards to find or buy a new house and move to a better place, in a sense, trapping them in their place as the literature shows. One hazard that appears to drive a house shift is riverbank erosion. Movements following riverbank and coastal erosion tend to

be short-distance as the literature and the qualitative analysis shows. While individual deficit rain years tend to drive migration, excess rain or even normal rain appear to encourage a house shift – possibly for different reasons. It could be a case of the prospects of a bumper crop following good rains that aids migration or crop loss in a flood that requires migration for work or moving away from a flooded place.

7.6 Conclusion

The evidence furnished in this chapter suggests that it is predominantly income needs that drive migration, as shown clearly in the chapter, Qualitative Analysis. People with income needs tend to migrate more. Though it may appear to be contradictory, among those who are in need of more income, it is people with more assets that actually migrate. It shows that thought migration is driven by poverty and income needs, the poorest, those without any assets are often unable to migrate outside the district. It is the youth – rather respondents in their 20s – who migrate more than others do. Migrations is boosted by the educational attainment of the migrant and boosted by social networks.

Among the climatic and environmental variables, experiences of drought and cyclone tend to positively influence migration outside the district – and riverbank and coastal erosion negatively. Rainfall uncertainties show different influences – with negative anomaly in rainfall showing no significance, but positive anomaly driving migration and normal rainfall positively and influencing migration in a highly significant manner. Experience of flood becomes a very significant or significant factor that negatively influencing migration. Migration of women tend to take a different pattern compared with that of men. Inter-district differences in migration are prominent, especially in the migration of middle-aged people from the cyclone-prone Satkhira and women in their late teens from the drought-prone Nawabganj.

The first instance of moving house is influenced by some of the drivers of inter-district migration, especially youth, poverty (not assets as in migration), and networks. Experience of droughts and floods appear to discourage moving house, and cyclones tend to have an even stronger hindering influence. Riverbank erosion tends to drive local movements. Excess rain or even normal rain appear to encourage a house shift. The general trends revealed in the regressions show that in contrast with many studies in the older climate change and migration literature (for instance, Tickle, 1989; Homer-Dixon and Percival, 1996; Myers, 2001) climatic and environmental hazards do not always drive migration – instead they sometimes tend to hinder migration as the models reveal. It is more of a story of mixed and differential influnces.

8.

Policy analysis

Challenges in making migration an adaptation strategy

Villagers in Bangladesh migrate for better livelihoods, amid climate and environment-related stresses and shocks, though not necessarily influenced by them as the previous chapter that deals with quantitative analysis shows. Nonetheless, in the context of a growing, city-centred economy based on urban industries and services that promotes urban migraiton (Muzzini and Aparicio 2013), migration can become an effective adaptation strategy (McLeman and Smit 2006, Barnett and Webber 2009, Tacoli 2009, Foresight 2011, ADB 2012, IPCC 2014). It can help people offset or recover from the impacts of environmental shocks and stresses. Bangladesh has a history of high levels of internal migration, with or without climate change (Afsar 2003, Gardner 2009).

In this context of high levels of mobility and climatic stresses and shocks, migration could be seen as one of the many adjustments that people make in response to actual or expected climatic stimuli or their effects. If that is the case, as per the IPCC definition of adaptation (Parry et al 2007), migration can be considered an adaptive strategy. While climate and environment-related stresses and shocks, including water shortage, cyclone, floods and coastal/ delta erosion (Adams et al. 2011a), migration also contributes to adaptive capacity of people by giving them better access to resources, livelihoods, markets and social networks (Gerlitz et al. 2014).

Still, often the poorest and the most vulnerable people are unable to migrate out of environments exposed to hazards, as the quantitative analysis shows. Experience of hazards appears to limit their capacity to migrate. Still the major policy concern in Bangladesh is not how to mobilise migration as a form of adaptation, but whether climate change will increase climatic variability and/ or the frequency of extreme events, thus adding to migration flows (Black et al. 2011b). Indeed, a textual analysis of current and recent policies concerning climate change, development and poverty alleviation, and disaster management shows that the economic and adaptive roles of internal migration are often usually not included in policy framing.

In contrast, this chapter argues that if migration works as a positive step towards adaptation, a range of policies could encourage and facilitate it, rather than ignoring or inhibiting it. The key challenge, however, is to align the policies with Bangladesh development and existing and projected migration patterns.

Based on the qualitative and quantitative findings, the following section explains how migration can be viewed as an effective adaptive strategy. The second section analyses how different government policies in Bangladesh – concerning climate change, development, and disaster risk reduction – view and deal with migration in the context of climate change and development and consider its potential as a climate change adaptation measure. Based on this examination, the paper suggests that there is considerable scope for policy realignment – to acknowledge, plan and promote migration under appropriate circumstances rather than inhibiting it. By way of conclusions, it lists out a few possible areas of policy attention and action (Martin et al. 2013)[2].

[2] *This chapter draws from the concept and content of Martin et al. (2013). The candidate designed the policy analysis, performed the text analysis and he wrote the working paper as the lead author.*

8.1 Framing of migration as an adaptation strategy

As the qualitative analysis shows, migration, climatic and environmental stresses and shocks in a background of social vulnerabilities and exposure to risks affect livelihoods and thereby influence people's migration decisions. When crops are damaged and stretches of land are rendered uncultivable due to these impacts, people often migrate in search of better livelihoods and income. The quantitative analysis supports these findings. It follows that while migration is largely driven by poverty, climatic and environmental factors play a role. While cyclones and droughts drive short-term migration, riverbank erosion drives more longer-term movements. At the same time, people exposed to disasters over a long term and those who are the poorest are often unable to move out of their place.

Amid changes in extreme events and disaster trends (IPCC 2012, World Bank 2010) and migration patterns in areas of high exposure to hazard such as the coastal belt (BBS 2012, Marshall and Rahman 2013), it is likely that more people will migrate in a changing climate (World Bank 2010). At the same time, migrants have reported that they could earn enough to offset losses suffered because of exposure to climate- and environment-related hazards and improve their income. Therefore, it can be argued that migration works as an effective adaptation strategy in the face of climatic and environmental stresses and shocks, even though people perceive it more as an economic activity. Considering this adaptation potential of migration, it may be worthwhile considering ways to mainstream it into policies. Given the record of migration in Bangladesh, this chapter argues that such migration could contribute to better standards of living and resilience at their home and destination, effectively becoming an effective adaptation strategy. In the following sections, this chapter analyses to what extent such adaptive migration finds a place in the policy environment in Bangladesh.

8.2 Policy stance on migration related to climate, environment and development

8.2.1 Policies dealing with climate change

After drawing up a national framework as mandated by the UN Framework Convention on Climate Change (UNFCCC) for the least developed countries (LDCs), Bangladesh submitted its National Adaption Programme of Action (NAPA) in 2005. The document noted that climate change will increase the impacts of natural hazards in the country, and made an urgent call to integrate adaptive measures into the development process (MOEF, 2005). Based on the broad directives of NAPA, the Climate Change Unit of the Ministry of Environment and Forests (MoEF) brought out the Bangladesh Climate Change Strategy and Action Plan (BCCSAP) in 2008. Both the documents were revised in 2009 after a government change.

To follow up on projects envisaged by these documents, the government set up a Climate Change Trust Fund (CCTF) in 2009. The CCTF has approved 43 government projects worth US $70 million, besides 32 NGO projects worth US $3.5 million. The government has also put in place the Bangladesh Climate Change Resilience Fund (BCCRF) – based on public finance – with development partners pledging US $113.5 million. The resilience fund is being managed and implemented by the Government with the World Bank's technical assistance. The government is also setting up a multi-donor Trust Fund (MDTF) to manage adaptation funds (UNFCCC 2014). During 2009–12, the government allocated US$350 million from its non-development budget and approved 107 projects worth an estimated 1,272 million Bangladeshi Taka (US $ 16.4 million) in areas that are vulnerable to climatic stresses and shocks (Pervin 2013). The government also draws from multilateral development banks and agencies for low-carbon resilient development (LCRD) investments. These donors include the World Bank, ADB and International Finance Corporation. Other major intermediaries include the Global Environment Facility (GEF) and national banks including the Central Bank (Pervin and Moin 2014).

Being the first key document mandating action in the face of climate change, the NAPA in its original form (MOEF 2005) set the tone for adaptation activities in Bangladesh. The NAPA narrative on migration, however, is characterised by an approach in which migration is assumed to be problematic. It treats migration as an undesirable outcome of climate change. For example, a diagram in the document mentions migration along with crime as an outcome of livelihood impacts of climate change (MOEF 2005: 17). In the list of projects, one promotes ways to adapt coastal farming to increasing salinisation. It envisages adaptation to floods, storm surges and sea level rise. Moreover, it adds as project outcomes: "Affected community would not migrate to cities for job and livelihood" (p 35); and "Social consequences of mass scale migration to cities would to some extent be halted" (p 36). Another project talks about the need to undertake adaptive measures in the North East and Central regions that are often flooded. As the document notes: "In the long–term, people might get a means to continue with farming instead of migrating to cities after the flood. This would to some extent reduce social problems of migration of the distressed community to cities" (p 37).

The Awami League government that came to power in 2008 supported the NAPA and BCCSAP prepared by the preceding government, but made its own contributions in their newer version as our key informant interviews in Bangladesh suggest. They selected migration as the issue to show this distinctiveness: most of the negative references to migration in the original NAPA were deleted, with the exception of one diagram on p 17. However, although the NAPA and BCCSAP were updated, still the revised documents did not see migration as an adaptation strategy worth promoting. The updated NAPA focused on four security issues, namely, food, energy, water and livelihoods, and respect for local community in matters related to resource management and extraction (MOEF 2009). The list of projects related to climate change was expanded further.

While the NAPA mainly lists immediate priorities, the BCCSAP focuses on medium and long-term goals on under six broad areas. These are food security, social protection and health; comprehensive disaster management; infrastructure research and knowledge management; mitigation; low carbon development; and capacity building and institutional strengthening. In line with the original NAPA, the original first version of BCCSAP (MOEF 2008) warns of grim scenarios of climate change. For instance, it warns: "...unless existing coastal polders are strengthened and new ones built, sea level rise could result in the displacement of millions of people" (MOEF, 2008: 1). It is due to farms becoming less productive with restricted livelihood options. Such migration, especially from the coastal zones is estimated to comprise 6-8 million people by 2050 (MOEF 2008). City slums, their likely destinations, are a potential problem given the fast, but unplanned urbanisation the country (ibid: 16). Still BCCSAP did not outline any policy response to such migration.

In its 2009 update, the BCCSAP has addressed migration in more detail, updating the figure to a staggering 20 million, suggesting that these 'environmental refugees' have to be resettled, possibly abroad. "Migration must be considered as a valid option of the country", the updated version notes. "Preparations in the meantime will be made to convert this population into trained and useful citizens for any country" (MOEF 2009: 17). The section on Research and Knowledge Management suggests "monitoring" of climate change-related internal and external migration and rehabilitation (MOEF 2009: 58). The key climate policy documents start with a pessimistic view of migration, but later their editions soften this stance by acknowledging migration as a viable option. While the original NAPA and BCCSAP documents seek policy interventions to either reduce the need to migrate, or deal with it as a form of forced displacement when it happens the updated 2009 version explores options to facilitate migration by training them and suggesting resettlement options.

8.2.2 Development and poverty reduction policies

Migration in Bangladesh is predominantly rural to urban, driven largely by a need for better livelihoods and income, as chapters 5 and 6 show. This push is complemented by the pull factor of city-based industries and services. Economic growth and changing economic activities since the early 1990s has have led to significant rates of rural-urban migration contributing to the growth of the cities (Muzzini and Aparicio 2013). In this context, the development policies of the country, leading to economic growth and subsequent rural-urban migration need to be studied to understand how they hinder, tolerate or facilitate climate and environment-related migration. As for development planning, poverty alleviation and social sector development were at the top of the government agenda over the past two decades. Domestic policy documents (such as the Sixth Five Year Plan and Outline Perspectives Plan) and those written as part of the government's international commitments (such as the National Strategy for Accelerated Poverty Reduction – Bangladesh's PRSP – and the country's progress report on the Millennium Development Goals) reflect these key concerns of the government.

The Sixth Plan has provided a blueprint for the country's development trajectory from 2011 to 2015. In contrast to policy documents in the climate field, it talked very positively about migration, though the stress was on international migration (Planning Commission 2011). This document noted that in underdeveloped regions, especially Khulna, Rajshahi, and Barisal Divisions, international labour migration could enhance development prospects. It talked about the possibility of 400,000 to 500,000 workers going on international migration.

Although migration appeared prominently, discussed across 15 pages of the Plan, the dynamics, complexities and outcomes of internal migration were barely considered. The plan did address the issue of climate change, its outcomes and adaptation challenges, the term appear-

ing 50 times in the 246-page document, including in a dedicated chapter that dealt with it along with environment and disaster management (pp 188-215). Yet in terms of climate-related migration, the document observed that 70 million people would be displaced due to "climate-induced flooding, cyclones and storm surges" (p153). Here the report resorted to a Malthusian take on climate-related migration as explained in the Literature Review (Chapter 2) and warned about tremendous pressure on land and natural resources, threatening to undermine the gains made in poverty reduction (p 188- 189). One of the key recommendations was to "mainstream poverty-environment-climate-disaster nexus in the development project design, budgetary process, project implementation and monitoring process" (p 196).

Out-migration from areas affected by climate change does find some brief mention (p188, p 202). However, the action points suggested under the themes of food security, social protection, disaster management, infrastructure, research, low-carbon development and capacity building failed to include migration. As such, the causes and consequence of climate and environment-related migration get a short shrift in the document. In short, forced migration in general is seen as a problem created by climate change, but internal migration is not seen as a potential form of adaptation by people affected by it.

Once the government accepted the Sixth Five Year Plan, the country's Outline Perspective Plan (Planning Commission 2010) was launched to achieve 'Vision 2021', the national long-term goal for development. Vision 2021 projects a development scenario in which citizens will have a higher standard of living, better education, better social justice and a more equitable socio-economic environment. The sustainability of this development is to be ensured through a range of measures, including better protection from climate change and natural disasters (Planning Commission 2010).

In contrast to the 6th Plan, the Vision 2021 document deals more substantively with migration, both international and internal. However, whilst on the one hand it welcomes remittances from overseas migrants, it also comments extensively, but most of the time negatively, on the sharp rise in rural-urban migration. Noting that slums account for more than 35 per cent of the population in all major Bangladeshi cities, the document expresses the concern that unplanned urbanisation and migration will restrict sustainable rural economic growth and make cities more hazard-prone. There is no rigorous exploration to probe what causes such urban risks. Still it suggests that domestic policy should seek to "reverse" the trend of migration to cities (p 68), through more spread-out urban development and better livelihood opportunities in villages, as well as "migration controls" (p 69). Thus village development is framed as a way to "weaken the forces of pull and push" and inhibit rural-to-urban migration. (p 69).

While the 6th Plan and Vision 2021 documents were prepared internally by the Government of Bangladesh, PRSPs are prepared in consultation with development partners, including the World Bank and the International Monetary Fund. With three-year updates, they describe the country's macroeconomic, structural, and social policies for growth and poverty reduction as well as major sources of financing – indeed, the Sixth Five Year Plan followed up on these findings. The first document came out in 2005 (IMF 2005). A key focus of the report (Planning Commission 2005) is the emerging rural–urban continuum, including the "dramatic expansion" of all-weather rural infrastructure developed in the 1980s.

These rural-urban transition zones are important for migrants as they share the complimentary and often conflicting characteristics of both, as linked systems an "uneven or lumpy, multidimensional continuum" (Iaquinta and Drescher, 2000:18). Often rural development and urban planning are inevitably connected with one another and intervention in one sphere in-

fluences the other. As rural-urban transition zones, peri-urban spaces are often affected by some of the most serious urbanization challenges. Some of the challenges are resource shortages, a prevalence of slums, degradation of farms and inadequate services including drinking water, sanitation, and environmental services (Dodman 2009). Sometimes planning regulations and land tenure norms are poorly implemented in such areas, increasing the risks borne by poor and other vulnerable people (Wisner et al 2004; Tacoli 2006). Often these peri-urban zones are at the heart of the political economy of land tenure systems and the balance of power between different owners and users and migrations often negotiate this space for livelihoods and living. As the qualitative analysis (chapter 6) notes that migrants often occupy peri-urban spaces and work in the informal economy with little access to civic services or amenities. To a large extent, policies do not look at migrants' habitat issues, even while a large part of the country's city-based urban growth depends on migrant labour as explained in chapter 3.

The PRSP document acknowledges the role that migrant labour plays in poverty reduction, though its relevance to the overall development process is very clear in the paper. It notes that migration and remittances have emerged as dominant factors, with "migration of varying duration to a variety of destinations both rural and urban as well as near and far is increasingly a critical part of the picture" (Planning Commission 2005:). It goes on to state: "Initial fears that migration was fuelling an export of poverty from rural to urban areas has now been dispelled by poverty trend statistics; in general, urbanisation appears to have been a force for poverty reduction with urban poverty declining much faster than rural poverty (p xvi). The document offers a window of opportunity to build on this recognition of the economic role of migration.

Still the new policy strategy paper that came out in 2008 (Planning Commission 2008) and its update prepared "in the light of Election Manifesto of the Bangladesh Awami League 2008" (Planning Commission 2009) does not take the internal migration agenda forward. This latest version stresses the need to enhance flows of remittances and provide loans to international labour migrants (ibid: 20), a transparent process (p 24), and better training in labour laws of the employing countries (p 134) – but it largely ignores internal migration. The section on 'Tackling climate change for poverty reduction' (p89 - 92) talks about livelihoods, disaster risk reduction, forestry and technology, but not migration. For the urban poor and slum dwellers, cooperatives, micro credit organisations and health facility improvements have been envisaged in the Poverty Reduction Plan (Planning Commission 2009). The new National Urbanisation Policy is expected to address such concerns in an even more focused manner. Of late, internal migration has become an issue discussed in policy circuits, still its dynamics or linkages with climate and environment-related factors and its role in development is just about beginning to be addressed, as field interviews suggest.

In its 2012 progress report on the Millennium Development Goals (MDG), the Government of Bangladesh emphasises on mainstreaming migration into development, climate change and environment policy to ensure sustainable development. The broad idea is to streamline plans to offset the impacts of environmental change and human mobility challenges over the coming years (Planning Commission 2012: 81). This report also promotes international migration as remittances contribute to development. It also recommends special measures for women international migrants. The phenomenon of rural-to-urban migration is framed as a challenge for the cities, further stretching basic services. The report notes that the population density in slums is many times the average population density of Bangladesh, which is already the highest in the world (Planning Commission 2012: 80). "Bangladesh faces a Herculean task in sustainably improving the lives of slum dwellers" (p 81). It requires a "significant im-

provement" in the lives of at least 100 million slum dwellers (p 75). A key recommendation is to assist legal migration, facilitate remittances and access to labour markets for international migrants (pp. 94-96). Internal migration dynamics, however, are largely missed out, though the welfare of migrants ending up in slums finds some policy space.

Nonetheless, policy documents (Planning Commission 2011, for instance) do address the prospect of large-scale displacement in a changing climate. In response, the government has tested some planned resettlement projects. One example is the Guchhogram Climate Victims Rehabilitation Project. Launched in 2009, this three-year project aimed "to settle the climate victims, landless, homeless, address-less and river eroded people on *khas* land or donated land with living accommodation and to make all such rehabilitated families owner of a piece of homestead land" (Guchhogram 2010). The rehabilitation of 10,650 landless families in 207 villagess. Government data shows that 8,958 families have been rehabilitated in 198 villages spread across all the seven divisions of Bangladesh by 2013 (Guchhogram [CVRP] Project 2013a).

Guchhogram is a follow up of the Poragacha Cluster Village initiative that Sheikh Mujibur Rahman started in 1972, a year after his nationalist party led the country to liberation from Pakistan after an armed struggle. The political tension that triggered the civil war in what was then East Pakistan was exacerbated by a disaster. In 1970, a cyclone killed an estimated 250,000 people in Bangladesh and the response of the erstwhile undivided Pakistan based in the western part of the country was inadequate (Heitzman and Worden 1989). After the liberation, on Rahman's advice, the Ministry of Land Administration and Land Reforms rehabilitated 1,470 landless families affected by the cyclone and riverbank erosion in the char areas of the Greater Noakhali district in four cluster villages. Later the government rehabilitated 45,647 families in 1,080 *adarsha grams* (ideal villages) in Adarsha Gram Project-I, and

25,385 families in 427 villages in the second phase of the project (Guchhogram [CVRP] Project 2013b).

Though the Guchhogram project has been criticised for being too small considering the scale of the problem of displacement (YPSA 2013), it serves as a model for planned resettlement of people displaced in climate and environment-related reasons. In a context of people migrating out of hazard-prone and underdeveloped coastal villages in search better livelihoods elsewhere (Kang 2012, Marshall and Rahman 2013), but often ending up in unplanned urban slums (MOEF 2008, Kreibich 2012, Muzzini and Aparicio 2013), such initiatives possibly offer a model for future. Model villages promoted as part of the Comprehensive Disaster Management Project (CDMP) followed up on this model (CDMP 2015). The prospect of such planned resettlement of people affected by climate change is a matter of emerging international research attention (de Sherbinin et al 2011, Ferris 2012, for instance).

While the above documents outline the general development policy direction for Bangladesh, the Coastal Zone Policy (MoWR 2005) narrates measures aimed at management of natural resources, sustainable livelihoods and promotion of renewable energy the coasts. It is a key document considering the climate and environment-related vulnerability of the coast. The document explores ways to ensure that "the coastal people are able to pursue their life and livelihoods within secure and conducive environment" (p 3). The solutions it offers include an integrated process approach, co-management and participatory decision-making, decentralization and development of the private sector (p 2). The policy seeks to reduce poverty and promote sustainable livelihoods so that the underdeveloped coastal zone can participate fully in the mainstream processes (p 3).

A rationale for the policy is "disasters and gradual deterioration of the environment" (p 1) in coastal districts, so disaster management is a key concern of the policy. Some 19 districts are

affected directly or indirectly by tidal waters, salinity intrusion, cyclones and storm surges (p 2). The document notes: "Reduction to vulnerability to natural disasters would be an integral aspect of the national strategies for poverty reduction" (p 4). It suggests effective early warning measures, dykes, protection against erosion and rehabilitation of people affected (ibid). However, there is not a single mention of the word migration.

8.2.3 Disaster Management Policies

The concern for disaster risk reduction gets specific attention in a set of disaster management policies and documents. Disaster management has received considerable attention in Bangladesh for much of the past two decades. The country has suffered considerable damage in terms of casualties, as well as loss of livelihoods and infrastructure – between 1991 and 2007, there have been 95 major disasters that claimed 200,000 lives and caused an estimated US $5.9 billion in damages especially in farm and infrastructure (MoFDM 2008). In collaboration with UNDP, the Government has initiated a transition from response and relief to comprehensive risk reduction in 2000. The outcome was the Comprehensive Disaster Management Programme (CDMP) that was approved in November 2003. It preceded the Hyogo Framework for Action 2005–2015, that was formulated at the 2005 World Conference on Disaster Reduction (CDKN 2011). Its Phase I (2004–2009) was a pilot for long-term disaster risk reduction and climate change adaptation in seven districts. At the national level, activities related to Hyogo Framework promoted further policy and planning mechanisms. Phase II (2010–14) activities envisage mapping of hazards, risks and vulnerabilities and setting up an early warning system (MOFDM 2008).

A few key documents spell out the specifics of the policy, the important ones being the National Plan for Disaster Management, the Disaster Management Act and the draft National Disaster Management Policy. In particular, the National Plan for Disaster Management 2010-

2015 is the blueprint for action in this field. In turn, operational aspects have been codified in the Bangladesh Disaster Management Act that was approved by the Minister for Food and Disaster Management in 2012 (MDMR 2013). It was first drafted in 2008, and revised and enacted in 2012. Under the act, the Department of Disaster Management (DDM) was set up under the Ministry of Disaster Management and Relief to reducing the overall disaster vulnerability by coordinating risk reduction, emergency response as well as humanitarian assistance (DDMf 2012). The policy-making process has been undertaken with NGO and community participation in the second phase (2010 to 2014) of the country's Comprehensive Disaster Management Programme (CDMP). The CDMP focuses on risk management and mainstreaming.

A comprehensive document that covers Bangladesh's disaster response measures is the National Plan for Disaster Management 2010-2015. It aims to address disaster risks comprehensively and reduce the vulnerability of poor people to the effects of natural, environmental and human-induced hazards. It aims at "(i) bringing a paradigm shift in disaster management from conventional response and relief practice to a more comprehensive risk reduction culture and (ii) strengthening the capacity of the Bangladesh disaster management system" (PreventionWeb, 2012). The plan document (DMRD, 2010) relates to climate change and development policies of the country discussed above. It also explains how different parts of the country become vulnerable to disasters. It analyses the socio-economic dimensions of disasters, and acknowledges the poverty-disaster interface and the impact of disasters on economic and social activities of the poor. It lists depletion of assets, reduced income due to loss of work, and increased indebtedness as factors that increase the vulnerability of the poor. It also notes how the cost to cope is disproportionately higher for the poor (p36), and acknowledges that floods and riverbank erosion are rendering people homeless. Still it falls short of addressing the option of migration as a strategy for poor people to cope with disasters or to adapt to

climate change. It includes out-migration as a factor that increases the vulnerability of the poor. Resettlement does receive a passing mention: "Disseminate the information for utilization in development planning and resettlement of vulnerable communities" (p73). Yet resettlement – usually a top-down state-led process – is not the same as migration as an adaptation strategy for poor people.

Similar to the National Plan, the Disaster Management Act and associated policies also address disaster risk in Bangladesh and make positive contributions to reducing loss of lives and livelihoods in account of disasters, but they largely overlook migration.

8.2.4 Migration policies

While the policies discussed above looked at how climate change, development and disasters influence migration, there is a set of migration policies in Bangladesh that deal largely with labour migration. The focus here is to examine to what extent they address climate and environment-related migration. The government policy on migration builds on the 1982 Emigration Ordinance that was devised at the height of labour demand in the Gulf States. As labour dynamics changed, there have been periods of restrictions on migration, notably in response to the exploitation of migrant workers, and especially migrant women. However, over recent years, policy has become much more open and facilitating, partly due to demand from migrant themselves and the recognition of the role that migration plays in the country's economy.

One example of this is the Overseas Employment Policy, 2006, which sets out the right of male and female workers from Bangladesh to choose overseas employment. It is aimed at regularising migration from all parts of the country. It protects the rights, dignity and security of the migrant workers within and outside of the country. It also seeks to ensure social protection of their families that stay back, and commits to strengthen the policy implementation

mechanism (Siddiqui and Farah 2011). A more recent legislation titled the Overseas Employment and Migration Act 2013 upolds and protects migrants' rights, based on the principle of non-discrimination. It allows supported emergency return of migrants if their host country is in any kind of crisis. It tries to prevent fraudulent practices and enforces accountability of recruiting agencies and their sub-agents. It also has a provision for functioning sub-agents. In the past migrants could not go directly to court against the misconduct of a recruiting agency. The new law allows a migrant to move court if the concerned government official fails to take legal action in time in such cases. Before its enactment, the draft law has gone through civil society consultation, and was presented to the Ministry of Law, Justice and Parliamentary Affairs (Siddiqui and Farah 2011, Siddiqui 2011). Apart from the above provisions, this law enhances the safety of women's migration, and makes recruiting agencies more accountable (MOF 2014).

8.3 Discussion

Growing urbanisation and industrialisation in Bangladesh includes migration as part of a 'single symbiotic process' (Marshall and Rahman 2013: 5). If that is the case, internal migration – along with international migration – is necessary for economic growth and poverty alleviation in the country. The Government of Bangladesh has taken this approach in its recent policy documents. The MDG Progress Report 2011 (Planning Commission 2012), for instance, places migration in the context of economic development, as well as environmental concerns. Meanwhile, the Sixth Five Year Plan (Planning Commission 2011), Ten Year Perspective Plan (Planning Commission 2010) and the National Strategy for Accelerated Poverty Reduction (Planning Commission 2009) acknowledge the importance of short-term international labour migration in the economic development of the country.

However, internal rural-to-urban flows, especially to the metropolitan core, are not generally encouraged so much in government documents. There is a growing recognition of internal migration in some of the policy documents (Planning Commission 2011, for instance). The stress is more on forced migration and the responses such as the Guchhogram project are largely reactive. In addition, whilst the overall view of migration in Bangladesh policy circles is becoming more positive in terms of its potential to promote development, a glaring omission in most of the policies discussed above is a lack of mention of internal migration or its portrayal in negative or, at best, general terms. This has a significant impact on how migration is seen as a phenomenon related to climate change, as policymakers are now trying to bundle climate change concerns — from disasters to gradual deterioration of the environment and loss of livelihoods — and address them in comprehensive policies. One issue is an apparent conflict of interests between the poor people who migrate to cities in search of work in large numbers and industry and business. The use and ownership of urban space is a contentious issue. The Sixth Five Year Plan document, for instance, talks about a tremendous pressure on land and natural resources exerted by the migrants (Planning Commission 2011: 188-189). The Outline Perspective Plan seeks to "reverse" the trend of migration (p 68) and put in place "migration controls" (p 69). In the plan document, there is no mention of the role of migration in delivering workers to the growing industrial sector, never mind its role as an adaptation to climate-related shocks in rural areas.

Indeed, although a city-based development pattern in Bangladesh draws people from villages in large numbers, surprisingly absent from government discourse is a proper acknowledgement of the economic contribution of internal migrants and their role in a growing economy. There is mention about changing farming practices and growth of cities — but this knowledge is not translated into an enabling environment for the migrant workers. There are exceptions such as the Guchhogram Project. However, the contribution of migrants to the

economy largely goes unnoticed. Research and policy measures often ignore unorganised temporary migrant workers, their agency and rights (Rogaly 2009).

At the same time, there is widespread awareness and a strong political will in policy circles in Bangladesh to acknowledge the impacts of climate change on development and growth. The Sixth Plan document notes: "... climate change will exacerbate the vulnerability of poor people to environmental shocks, with the predicted increase in extreme climate events (Planning Commission 2011: 165). This understanding is part of an effort of the government's effort to mainstream concern regarding climate change into the overall planning process. Climate change is not being treated as merely an environmental issue, but a development issue. In turn, the country has developed a more proactive stance towards migration that sees this also as integral to development, even if the focus to date has been on international rather than internal migration.

Even though many policies in Bangladesh are progressive and people-friendly, there is some concern about a lack of co-ordination among different ministries with policies tending to take a silo approach, not accounting for issues addressed in different, but related policy areas. For example, the Overseas Employment Policy that is pursued by the Ministry of Expatriates' Welfare and Overseas Employment (MOEWOE) does not deal with climate change issues; whilst environmental policies pursued by Ministry of Environment do not look into the broader aspect of labour migration that the government is promoting. There is no monitoring and evaluation process built in to the policy (Siddiqui and Farah 2011), although the government is collaborating with international agencies to better understand climate and environment-related migration (ADB 2011). IOM has also initiated policy dialogues on mainstreaming concrete short and long-term migration adaptation strategies in Bangladesh based on emerging evidence.

Another aspect of migration that does not find mention in policies is irregular cross-border migration. This is a thorny issue in India-Bangladesh bilateral relations, especially after India resorted to tough border control measures in recent years (AP 2012). The issue has cropped up in several bilateral meetings of security agencies, and at the Home Minister level. A Coordinated Border Management Plan between the two countries aims to curb illegal border crossings and incidents (Rajya Sabha 2012), even as international agencies such as the IOM are trying to use provisions for cooperation under the South Asian Association for Regional Cooperation (SAARC) Convention to promote a more flexible approach. Bangladeshi migrants are also reported to travel to Malaysia through the Bay of Bengal and then jungles of Thailand (Siddiqui 2014). In 2014, about 54,000 people migrated to Malaysia through this route, 53,000 of them Bangladeshis; 540 people are estimated to have died attempting the passage, mostly due to starvation, dehydration, and violence by crew (UNHCR 2014). In the first quarter of 2015, about 25,000 people have departed from Bangladesh and Myanmar in irregular maritime movements from the Bay of Bengal, almost double the number from the same period the previous year; an estimated 300 people have died at sea (UNHCR 2015). These reports show the risky nature of international migration for many Bangladeshis that are often inadequately addressed in policies. Since cross-border and international migration also involve climatic and environmental influences, they need to be addressed as part of a comprehensive migration policy regime.

A close look at migration patterns in Bangladesh shows that more often than not, migratory movements are within the country. Often they involve short-term shifts to neighbouring places that are familiar to the migrants. Village-to-village migration and often urban forays help the migrants supplement their livelihoods and tide over tough phases and lean seasons. Often people move back and forth, following regular patterns in different scenarios is mobility. Mobility broadly means the freedom to seek opportunities to improve livelihoods, living

standards and services such as health care and education – succinctly put, safer and more productive life in more responsive communities (UNDP 2010). It is a broader concept than migration, a fundamental element of human freedom (UNDP 2009).

Migration experts increasingly suggest that policies that acknowledge and promote human mobility succeed and those that restrict it fail (de Haas 2009). Yet despite some movement towards recognising this, our analysis of key public policies in Bangladesh suggest that the country remains some way from acknowledging the potential benefits of migration for adaptation to climate change in practical ways. Efforts at such a policy realignment could start by acknowledging voluntary labour migration – both internal and inter-national –as a way to improve the resilience of climate vulnerable communities and an effective adaptation strategy. Beyond the strategies and projects proposed in the NAPA and BCSAS, the government could also frame a comprehensive climate change policy aimed at climate-resilient development, which appreciates the role of migration as a climate change adaptation strategy and address the hardship of displaced people. To ensure that migrants benefit from such a policy, reforms are also needed across different socio-economic and development policies. There is a need to establish the habitat rights of the displaced people in *khas* (state-owned) and diluvian (flood-related) land. At the same time, labour policy should be made more comprehensive and inclusive to protect the rights of internal migrants – ensuring living wages, access to health care, social safety net and civic services, and safer working and living conditions. Such protection is especially important in construction, garment, and brick kiln industries, where people from climate-vulnerable areas often find work.

Meanwhile there is a need to focus on areas affected by climatic hazards. A review of the Overseas Employment Policy 2006 would make it easier for people from such areas to obtain short-term international migration contracts. Vocational training facilities such as technical

training centres of the Bureau of Manpower Employment and Training (BMET) and the ministries of youth and education could be extended to these areas. The government-run Prabashi Kallyan Bank (Migrants' Welfare Bank) might also offer better services in such areas to provide loans for prospective migrants and to promote enterprises using remittances, thereby enhancing job opportunities. Such creative use of remittances can contribute to local resilience and rebuilding after disasters (Stern 2007). To streamline such intervention, labour and overseas employment ministries would need to have representation in government committees dealing with climate change, such as the Inter-ministerial Climate Change Steering Committee, the technical committee of the Climate Change Trust Fund (CCTF), National Environment Committee, National Committee on Climate Change and Climate Change Unit.

Policy realignment is a political process that requires procedural and administrative interventions. Given the political will, the commitment of the national government to put in place effective climate change adaptation mechanisms (UNFCCC 2014), and the administrative facilitation of such measures as described above, a reform process that enhances the adaptation role of migration is certainly possible.

8.4 Chapter conclusion

This thesis argues that villagers in Bangladesh migrate for better livelihoods, sometimes in response to climatic stresses and shocks. Most of this movement is within the country and if facilitated appropriately, such internal migration – along with international migration – can be an effective adaptation strategy. It can help build individuals' and communities' adaptive capacity to future environmental and climatic hazards. While migration happens in the context of a growing city-centred economy that promotes remittances to villages. However, a textual analysis of current and recent policies concerning climate change, development and

poverty alleviation, and disaster management shows that the economic and adaptive roles of internal migration are often not included in policy documents.

Though recent documents acknowledge that there is a great deal of migration in and from Bangladesh, the responses outlined are largely reactive rather than proactive. Migration is often framed as a problem (for the migrants), outcome of a problem (at the migrants' place of origin), or cause of more problems (at the destinations). So policy measures tend to be prescriptive, often attempting to restrict or discourage migration by a various means including rural development and alternative livelihoods or deal with problems at the destination. At the same time, city-based growth encourages migration at a large-scale. In that case migration is part of the economic activity that helps people offset the impacts or rural poverty as well as climatic stresses and shocks and environmental degradation. Here the argument is that if migration works as a positive step towards adaptation, then the key challenge is to realign the policies with this new understanding.

9.

Discussion

Weaving together the migration story from the analyses

This chapter synthesises the findings of the thesis, draws new lessons, and identifies some of the uncertainties that it leaves behind in its effort to understand climate- and environment-related migration in Bangladesh. It draws from the key findings discussed in the three empirical chapters (chapters 6–8) and relates them to the case study (chapter 3) of Bangladesh and the broader context discussed in the literature review (chapter 2). While placing these findings within the scholarship in the field of climate- and environment-related migration, it traces the storyline of people responding to climatic and environmental stresses and shocks as well as perceptions of the risks they pose – by staying or moving. The story set in the context of a country facing frequent and devastating climatic stresses and shocks, a climate change hotspot (Haq 2001; Huq and Ayers 2008) can be of possible academic and policy and relevance; and contribute to opening up future avenues of enquiry.

First this chapter pools together key findings from the empirical chapters –qualitative quantitative and policy analyses – and weaves them into a single, coherent narrative. Second, it traces the linkages of different strands of this narrative to the literature and identifies how they challenge or chime with their findings. Third it examines how migration in Bangladesh can be seen as a climate change adaptation measure, how to ease restrictions to mobility – on account of people's abilities and choices, opportunities and resources they have, and the poli-

cy environment – that could in effect trap vulnerable people in potentially hazard-prone places. Summing up, it acknowledges the limitations of this research effort, uncertainties involved, and explores ways to engage further in this field.

9.1 Synthesis of the empirical chapters

9.1.1 Socio-economic factors that drive migration:

The empirical chapters together give a multi-dimensional view of climate- and environment-related migration in Bangladesh. The qualitative analysis (chapter 3) narrates mass movements of people from across the country, especially its less developed coastal belt, which is also exposed to climate- and environment-related hazards such as floods and cyclones (BBS 2013; Marshall and Rahman 2013; Muzzini and Aparicio 2013). The respondents in general note that usually it is income needs that drive their migration in the context of rapid urban growth. People living in areas exposed to climatic stresses and shocks – floods, droughts, cyclones and riverbank erosion – often have to diversify their livelihoods to ensure better income and sometimes to offset losses suffered on account of these hazards. The share of farm-based livelihoods still constitutes a major share of Bangladesh's economy, but it is shrinking.

The quantitative analysis supports this narrative of poverty-driven migration with numbers. Poverty comes across as a significant variable that positively influences migration – though it is not necessarily the most significant factor. While poor people leave an environment that does not support their livelihoods adequately, many draw on their assets for survival at their place, staying put, without migrating. It appears to be difficult for people without assets to undertake migrations outside their district of origin as the quantitative analysis finds. Long-distance migration requires a significant amount of resources that people without any asset may not be able to gather easily. The study also shows that though poverty drives migration,

the poorest are often unable move out, in effect possibly getting trapped in environments of potential hazard risk.

While it is poorer people in villages with assets who tend to migrate, they draw from the experience and support of friends, family and peers who have undertaken similar journeys. The qualitative analysis shows that often social networks play a very important role in migration, by telling people about opportunities and the way to go about migrating, financing and facilitating their journeys. People often follow the migration routes charted and undertaken by their friends and family, neighbours and colleagues. The migrants trust the accounts of their social network members more than any other source – governmental or otherwise – while making migration decisions. Such accounts often influence the direction of migration and the choice of livelihoods at their destinations as the literature shows. This narrative is strongly supported by all the models in the quantitative analysis. Social networks come across as a highly significant variable that positively influences migration outside the district as well as moving house.

It is clearly younger people, who have better chances of employment and those with more education tend to migrate more. However, the role of education was not very clear in the qualitative study though that of age was clear. It is often younger respondents who talked more emphatically about leaving home for work outside. Education, however, has a negative impact on migration within the district as the quantitative analysis shows. This could be because migration outside the district is to centres of economic activity, clearly a choice for better economic opportunity. Possibly, respondents who are more educated are better placed to undertake such endeavours than others, as the literature suggests. Movements within the district possibly denote more of the same livelihood activity under better circumstances, so education does not really add value to such a shift.

Even while migration decisions are made mainly for better livelihoods and income, in the background of climatic and environmental stresses and shocks, they are not solely based on consideration of cost and benefit (Massey et al. 1993) or risk and resilience (Wisner et al. 2004). The processes are far more interlinked and complicated than any simplistic, mono-causal model can predict. People experience changes around them, perceive the risks they pose and assess the response options before them, as the qualitative analysis shows. The respondents' own attitudes as well as socio-economic background, cultural practices and social norms influence the choice of options before them, as the qualitative analysis shows. Migration decision-making is a deliberate act that involves agency, but mediated by a set of social and cultural variables.

The qualitative analysis frames migration as a socially acceptable behaviour that people engage in for economic gain in the context of their experiences of the local climate and the environment and the perceptions of risk they pose. These decisions are also influenced by a set of behavioural components. In this framing, migration across different spans of time and space is a strategy to diversify livelihoods for better income. So households often diversify livelihoods by sending one or some of the members away to work and thus reduce their vulnerability to shocks and stresses, including climatic ones. At the same time, the prevalent local narrative of migration is all about improving income. A hostile environment, even when environmental stresses and shocks make livelihoods increasingly insecure and unsafe, works as a grim background of the migration in which the migrants are heroes, not victims. In short, in a range of time-space combinations, migration contributes to local resilience, and climate change adaptation, though migrants themselves do not use these terms or explicitly acknowledge these notions. This aspect is discussed in detail in sub-section 9.2.3.

Migration decisions are taken firmly and deliberately, the respondents carefully weighing the pros and cons of migration against other options, as the qualitative analysis finds out. This finding follows up on earlier studies that reached similar conclusions (Kniveton et al. 2008, Smith et al. 2010, and Kniveton et al. 2011). Even when there are climate and environment-related threats, the decision-making process involves testing the possible options and outcomes – through comparison with experiences of family, friends, neighbours and peers. This may not be the case in the case of displacement after sudden events such as riverbank erosion or a cyclone. The creative and bold actions involved in migration – with no external support – suggest that people have a sense of control over their destinies. Even while there is a shared belief in the pre-destined nature of disasters as Acts of God, it does not hinder preparatory and remedial action.

9.1.2 Climatic and environmental factors that drive migration

The respondents, especially in the cyclone-affected Satkhira district and the drought-prone Nawabganj talked about moving out of their place after heavy losses suffered because of climatic shocks and stresses. It is not only a one-off event of a severe drought or a devastating cyclone that push out people, but also their lingering effects such as dipping ground water levels, salinity intrusion after a storm surge, and fallow farms that lead to loss of farming and fishing livelihoods and labour opportunities. In Munshiganj, prone to floods and erosion, the story is often that of sudden displacement after the local river swallowing up part of the farm, homestead or the house itself.

Looking at the tales shared by respondents in the qualitative part of the study more closely, it appears that while it is income needs that drive migration, landless and marginal farmers tend to migrate more than those with better means, especially in the aftermath of weather uncertainties and associated losses. Combined with findings from the quantitative analysis it ap-

pears that such movements often involve short distances, within the district, or short-term or seasonal trips outside the district. The long-term moves outside the district are driven by poverty, but supported by assets. That means migration often becomes a fallback mechanism for poor people or coping strategy at times, especially after disasters. Still, it becomes difficult for the poorest to migrate to a faraway city to earn a better living. Poverty and income needs are cited as the main reason behind migration – an observation validated in the quantitative analysis as explained below. Still climatic and environmental factors often impoverish people, or make people poorer, as the qualitative analysis notes.

As villagers in Gabura recalled, their farms were inundated in the storm surge after the 2009 Cyclone Aila. Three years hence, at the time of the field work for this thesis, Aila's legacy still lingered on in Satkhira district. The villagers could not grow rice in their farms due to salinity left by the storm surge that had inundated the village. Often the solution for problems such as climatic and environmental stresses and shocks, as the focus groups reveal, is seasonal migration, with men working in faraway farms or in towns. In Gabura, the local women said that the men go to work for three to four months at a stretch to work in farms within or outside the district or in search of opportunities for casual labour in cities. Meanwhile their village still remained vulnerable to weather extremes, exposed to fierce storms and possible inundation if the storm surge breaks its mud embankments.

In such a context of hazards and their lingering effects, migration becomes a strategy to deal with multiple stresses. The quantitative analysis throws more insights into this multi-causal nature of migration. It confirms that migration is largely a poverty-driven phenomenon, also influenced by stresses and shocks such as cyclones, floods, rainfall variability, and droughts. Cyclones and droughts appear to push inter-district migration, reflecting the interview narra-

tives of the respondents of Satkhira and Nawabganj, respectively, in the qualitative part of this study.

Migration of families and women from the coastal areas has been explained by the overall disaster vulnerability of the coastal region in recent literature. There has been large-scale migration from the coastal areas affected by Cyclone Aila and often whole families migrated due to livelihood stresses (Poncelet et al. 2010, Mallik and Vogt 2014, Islam and Hasan 2016). Recent literature shows that such migration is different from displacement to in the immediate aftermath due to destruction or inundation of habitat, but driven by livelihood needs. People tried to live in their places of origin, at least a week after the disaster, however, scarcity of water and food crisis led to long-term migration to urban areas, especially Khulna city and its peripheries (Islam and Hasan 2016). A factor that adds to migration is increased stresses in farming livelihoods. For instance, recent modelling identifies salinity and temperature stress reducing crop productivity, and private debts further impoverishing farmers in the coastal area (Lazar et al 2015). Studies in coastal Bangladesh show that woman's livelihood activities including gathering natural resources and protecting family assets (including farms, ponds, poultry and cattle) can be is severely affected by climate variability and change (Garai 2016).

Meanwhile riverbank erosion prompts short-distance, largely local-level movements. In the northwestern region, at Chorpka village of Nawabganj that is prone to riverbank erosion, a 35-year-old woman narrated her experience of forced migration: "In 1998 we were displaced due to flood and riverbank erosion. At first we migrated from Radhakantapur to Sohimullah village. Again we faced the same disasters in 2000, 2004 and 2008 there, so we came to Chorpka village." Such multiple displacements are commonly reported from the district's riverine islands as the literature shows. The quantitative analysis places riverbank erosion as

a significant reason for people leaving their villages, but not necessarily the district. The experience of erosion has a positive influence on moving house, but negative influence on inter-district migration as the respective logit models show.

In poverty-related migration supported by social networks, climate- and environment-related experiences often play a strong positive or negative role as the qualitative analysis shows. Respondents who have experiences of climatic and environmental stresses and shocks also tend to be concerned about the risks they pose as the qualitative analysis shows. These experiences and concerns often necessitate diversification of livelihoods to enhance income. This risk concern factor could not be ascertained in the quantitative models possibly due to inherent limits of the tools used – in correctly assessing the level of concern about climatic and environmental events and processes.

In the qualitative analysis people said that such uncertainties, stresses and shocks affected their livelihoods, but seldom linked these experiences to their migratory movements. It is only in the case of sudden changes—such as loss of land due to erosion or flooding due to a cyclone—people acknowledged that migration could be a coping strategy. Significantly, respondents almost never associated floods, however frequent and severe they maybe, with long-term migration. Floods appear to discourage local movements as well as inter-district migration as the quantitative analysis shows. The quantitative analysis shows that experiences of cyclones and droughts have largely positive influence on inter-district migration, but negative influence on local moves. On the contrary, riverbank erosion has a negative influence on inter-district migration and positive influence on local moves. This observation chimes with what has been shown in the qualitative analysis and in the literature discussed in chapters 2 and 3. While exposure to cyclones and droughts tend to drive migration for better

or alternative livelihood pursuits elsewhere, riverbank erosion often involves displacement – often over a short distance, sometimes repeatedly.

A combined reading of the first two empirical chapters shows that it is not necessarily the hazards prevalent locally that drive migration but a variety of factors – largely poverty, scarcities, and uncertainties – in combination. When people migrate for better livelihoods, sometimes in response to climatic stresses and shocks such migration can be interpreted as an effective adaptation strategy. This thesis assumes that such migration can help build individuals' and communities' adaptive capacity to future environmental and climatic hazards. At the same time, migration happens in the context of a growing city-centred economy that promotes remittances to villages. The policy analysis (chapter 8) probes how the government views these movements, their underlying causes, consequences and implications; and attempts to facilitate ignore or control migration. As such, the policy is largely silent, if not outright negative at times, about acknowledging the role or migration as an effective climate change adaptation strategy as this thesis argues. Still, the country's economic policies promote city-based growth at a fast pace, thereby tacitly promoting large-scale rural-urban migration.

9.2 Linking with the literature

9.2.1 Different dimension of climate- and environment-related migration

This thesis relates to the literature on climate- and environment-related migration in three dimensions. First, it underscores the multi-causality of migration as conceptualised in some of the neoclassical migration theories and recent influential empirical and synthesis studies. Even when climatic and environmental stresses shocks influence movement decisions as this thesis argues, it is primarily income needs that drive migration as this thesis shows.

Second, the thesis illuminates the differential impacts of climate-related hazards in driving or inhibiting migration – across types of hazards and socio-economic categories of people. Besides, the effects of different disasters and hazards have a broad range influence migration – from causing sudden displacement and prompting migration for better income to causing immobility. This finding is a clear departure from early literature about what has often been described as 'climate-induced' migration, and the notion of direct and positive correlation between climatic stresses and shocks and migration.

Third, as a follow up, the thesis stresses on the implications of immobility of people in hazard-prone places, an issue that has gained attention in recent literature on climate- and environment-related migration. Closely connected with this issue is the way people perceive the influence of climatic and environmental hazards in their migration decision. As the thesis blends people's experiences of climatic and environmental hazards with instrument observations to test the climatic and environmental sensitivity of migration decisions it looks that these linkages from different vantage points. It finds that people usually do not associate their movement to the hazards that appear to indirectly affect their livelihoods, even when they influence movement patterns – or inhibit migration altogether.

Migration here is framed as a beneficial activity that helps people offset losses suffered as a result of climate- and environment-related stresses and shocks and be better prepared for such experiences in future it can be considered an adaptive activity. On the basis of such a conceptualistion, the thesis considers the policy implications of its findings, especially on how restricting migration from hazard-prone places might make such immobility a big problem as vulnerable people might get trapped in such places.

9.2.2 Multi-causality of migration

The first point about multi-causality of migration has found expression in reviews and synthesis studies. Migration has been conceptualised as a varied and complex outcome of economic, social, cultural, demographic, and political processes operating at different levels (Castles and Miller 1993). In a matrix of poverty and inequity, as the environment changes and resources get used up, climate along with other socio-economic, environmental, political, and demographic factors, could drive migration (Lonergan 1998). Foresight (2011) stresses on this multi-causal nature of migration and outilines how migration patterns change as a result of the influence of global environmental change on multiple drivers of migration. (Kniveton et al. 2008), for instance, explain as migration as one among many ways that individuals, households and communities use to escape poverty. Theoretically, this view reflects what early migration theorists have proposed about the multi-causal nature of migration. As the literature review shows, migration has been conceptualised as an adaptation to perceived changes in environment, a way to escape from the marginal status in the migrant's palce of origin in search of better opportunities in a chosen destination (Wolpert 1965).

Recent empirical studies in Bangaldesh on climatic and environmental stresses and shocks and their impact on migration have focused on how income needs, rather than the hazard per se, drive migration. Gray and Mueller (2012), for instance have shown that household-level economic damages averaged a fifth of household expenditure for flooding and 12 per cent for crop failure, though the recovery rate for households that have experienced migration crop failure was slower than that of flood-affected households. In effect crop losses, even when not associated with floods, led to more migration than when people faced flood alone. On another plane, Gray and Mueller (2012) stress on the multi-causality of migration and argue that it is not the poor who always migrate, possibly due to multiple barriers. The inability of peo-

ple without any asset to undertake long-distance migration is recurrent theme in this thesis. The issue of immobility of the poor is a key concern raised in thesis as discussed below.

Related to the above analysis, but in what appears to be a contradictory note, Penning Rowsell et al (2013) argue that population movements are driven by the need for safety and income recovery after hazard exposure, especially for landless people. In their study on cyclones in Bangladesh Paul and Rautray (2010) note that migration is more prevalent among people in the lower income category than in higher and middle income groups. While this thesis shares the notion that among the multiple causes of migration income takes a predominant role, it further argues that people without assets find it difficult to migrate out of the district even though lack of assets is not a barrier for short-distance shifts.

9.2.3 Differential influence of climatic and environmental factors on migration

The second point about differential impacts of hazards in migration patterns finds expression in the logit models. They show that experiences of drought and cyclone appear to positively influence migration outside the district, even while these hazards have a negative influence on the first house shift that is largely within the district. Short distances movement that happens because of these hazards – as reported in qualitative analysis and the literature – is likely to be short-term moves that do not involve shifting of residence. While riverbank erosion as well as floods negatively influence long-distance movement, though people affected by erosion tend to move locally. Each of this observation finds reflection in the existing literature.

Recent literarture shows strong evidence for seasonal and temporary migration in Bangladesh. Droughts, especially in northern Bangladesh, often lead to lean periods between harvests called *monga*, marked by poverty and food insecurity (Findlay and Geddes 2011, Etzold et al 2013). Landless labourers, mostly boys and men from *monga*-affected areas migrate seasonally to cities and better-off villages in search of work (Siddiqui 2009). Penning

Rowsell et al (2013) report that drought in the dry season translates into reduction in farm work opportunities, driving seasonal migration by men to other districts where there is a better demand labour; however permanent movement over the last decade involved only less than a tenth of the households. Disasters, especially, droughts, prompt temporary, short-distance moves in Bangladesh, but their influence on permanent migration is found to be minimal (Bohra-Mishra et al. 2014) Research elsewhere also associate drought with migration (Munshi K 2003 and Henry et al. 2004 for instance). In this thesis, drought-driven migration is a recurrent theme in focus groups and interviews; and drought comes across as a strong driver of migration outside district as the quantitative analysis shows. While the qualitative analysis captures the extent of the temporary and seasonal movements because of drought, but the logit models show strong evidence for long-term migration outside the district.

One hazard that appears to hinder long-distance and short-distance movement is flood, a yearly occurrence in many parts of Bangladesh. The literature shows that though flooding is frequent, widespread and damaging, it has only modest effects on mobility (Gray and Mueller 2012). A reason behind the subdued effect of flooding on long-term mobility could be communities "adapting" and developing resilience to "normal" floods (Penning-Rowsell et al 2013: S45), and assistance programmes that follow floods making migration unnecessary. Flooding, however, causes a lot of short-term population displacement, but few long-term moves (Gray and Mueller 2012) and evidence for long-term population relocation are inconclusive with few large-scale quantitative studies (Penning-Rowsell et al 2013). In the qualitative analysis, people talked about this temporary nature of flood-induced movements. The quantitative analysis shows that flooding has a negative influence of migration outside the district as well long-term movement within the district. Migration does help people cope with climatic and environmental stresses and shocks; however, disasters can also sometimes

reduce migration by cutting down resources needed to migrate, or by increasing labour needs in the points of origin as the literature shows (Gray and Mueller 2012, Mallick and Etzold 2015). The experience of flood as observed in this thesis seems to support what has been reported in the literature.

Yet another trend shown in the thesis is that of widespread experience of rainfall variability and a direct and its relationship with migration as qualitative and quantitative analyses show. This observation chimes with rain gauge observations showing a hike in March–May rainfall by 3.4% and a dip in June–August rainfall by 1.7% between 1960 and 2003 (Karmalkar et al., n.d.). The literature also predicts heavier and more erratic rainfall in the whole of Ganga, Brahmaputra and Meghna system with a wetter future for Bangladesh (World Bank 2010; Dasgupta et al. 2011; Immerzeel et al. 2013). Migration literature (Wolpert 1965, for instance) has identified rainfall variability as a key determinant of migration. Empirical literature – in the African context – shows that people from areas affected by rain-deficit and rainfall variability are likely to leave their village compared with those living in wetter areas (Henry et al 2004). The MARC model (Kniveton et al 2011) explains how individuals make migration decisions when the rainfall patterns change (please see the literature reviewed in chapter 2).

EACH-FOR (2009) notes that households try to offset losses suffered in climate-related risks such as rainfall variability with short-term, seasonal, or permanent migration to ensure better food and livelihood security. Following up on this research, (Warner et al 2012: 17) reiterate that rainfall variability has an impact on household income and migration decisions. Dang (2014), however, has noted perceptions of climate variability as a factor that could also limit adaptation choices. However, Bohra-Mishra et al. (2014) reports that in conditions that are initially dry, a reduction in rainfall increases migration, while in wetter conditions, an in-

crease in rainfall increases migration. One of the logit models show that a positive anomaly in rain increases long-distance migration, while normal rain reduces migration. It partially supports this observation of Bohra-Mishra et al. (2014). The rationale could be that in dry areas, an unexpected increase in rainfall could come as a boon, boosting crop production so long as it does not lead to floods and crop damage. On the contrary, in a wet place, such an anomaly could mean flood and crop damage. Negative anomaly in rainfall, however, does not appear to drive long-distance migration as the literature shows. At the same time anomalies – negative as well as positive – and normal rain tend to be associated with house shifts within the district due to different reasons as explained in the chapter 7.

Frequent cyclones are considered a major driver of migration. Cyclone Aila for instance, involved a storm surge that was 4-metre-high along the coastal stretch, flood areas up to 600 m away from the coast in low-lying areas, but spreading havoc riverbanks and islands more than 40 km upstream along the river network (Gayathri et al 2015). The lasting impact of cyclones include failures in cropping and shrimp farming due to salinisation could also alter migration patterns (WARPO 2006). Typically, after hazards people move to safety and the landless among them move for income recovery (Penning-Rowsell et al. 2013). Besides, the latest census figures show a trend of migration away from the coast. The logit models show a clear associate between long-distance migration and cyclone exposure.

In short, the thesis shows that while climate and environment-related stresses and shocks influence human movement is many different – and complex – ways. Studies have found that people often move for short periods over short distances as a result of disturbances to their habitats, safety and livelihoods (Poncelet 2008, Findlay and Geddes 2011, Mueller and Gray 2012, Etzold et al 2013). However, such hazards often do not affect, or sometimes decrease long-distance moves (Gray and Mueller 2012, Henry et al 2009b, Kniveton et al 2008).

In that sense, this thesis only partially supports the finding of Penning-Rowsell et al. (2013) that a large share of migration (as opposed to evacuation) is caused by riverbank erosion, floods and cyclones have less permanent impacts without loss or long-term changes. While floods seem to discourage migration as this thesis finds cyclones and droughts influencing migration outside the district. On the contrary, droughts and cyclones tend to negatively influence long-term movement within the district. At the same time, logit models show riverbank erosion having a significant positive influence on short-distance migration in line with the literature. It displaces 50,000 to 200,000 people in Bangladesh every year (Mehedi 2010). As it destroys farms and homes (Zaman 1989) sometimes, communities are displaced several times, in a dramatically different way compared with migration for economic gain (Hutton and Haque 2004). A study by Abrar and Azad (2004) in northwest Bangladesh found that on average households have been displaced 4.6 times by riverbank erosion. More recent research suggests that permanent migration is common among the people affected by erosion, even though the rate of erosion may have become more moderated (Penning-Rowsell et al. 2013). However, riverbank erosion has a negative influence on inter-district migration as the quantitative analysis shows.

9.2.3 Immobility of people in hazard-prone places

Last, but not the least, the logit models also suggest that though migration is driven by poverty and income needs, the poorest, especially those without any assets, are often unable to migrate outside the district. This observation in the thesis is also in line with international literature that shows droughts – and famines – encourage migration by poor farmers, though not the poorest (Kniveton at al. 2009). This immobility is a cause for concern as people who are unable to move out – the poorest and the most vulnerable – could get trapped in places exposed to climatic and environmental hazards. At the same time, the qualitative analysis shows that even while people migrate instinctively – in a planned manner – to escape from the ill

effects of climate and environment on their livelihoods, they do not associate these movements to these elements. This apparent lack of appreciation of the real impact of climate and environment on their lives and livelihoods is possibly an issue that needs to be addressed, especially in the context of addressing immobility. People often do not appreciate risks involved in their livelihoods and environments and such lack of risk appreciation could be detrimental to effective disaster risk reduction (Covello and Sandman 2001). This even leads to permanent migration to disaster-prone, vulnerable locations a practice that is very common in coastal Bangladesh as Paul and Rautray (2014) report. This apparent lack of appreciation of the real impact of climate and environment on their lives and livelihoods is possibly an issue that needs to be addressed.

The logit models indicate that experience of certain hazards tend to negatively influence migration. This phenomenon requires closer look as long-distance migration is a selective process that favours younger persons with more education and assets in their search for better income. Logically that means poorer, older and less educated people might get left out of the process. The literature suggests that though migration to cities is a preferred option, not everybody has access to this mechanism, especially those with not many assets. It appears to be a paradox. While it is people in need of more income who migrate, those who cannot muster enough resources back home – those with no assets – tend to left out of the migration process.

Flooding and riverbank erosion appear to have a negative impact of inter-district migration. As explained above, riverbank erosion tends displace people more locally –still the concern is that the disaster tends to incapacitate people to move out of the district to earn a better income. Flooding is more of a case of temporary movement – till the rainy season gets over and the floodwaters recede. People seasonally move back and forth from flood plain. However,

such chronic exposure to floods appear to reduce the ability of people to seek long-term alternatives offered by inter-district or even short-distance migration.

Meanwhile droughts, flooding and cyclones appear to discourage movement within the district. This observation about drought and cyclones could have potentially serious implications those with more assets migrating out of the district after exposure to these disasters; but those with less assets being unable to move even locally. In the case of flood, people do not appear to move anyway. It could be argued that with prolonged exposure to hazards, people might not be able to muster enough resource to make undertake journey – across short or long distance as the case may be. That means vulnerable people could in effect be trapped in places exposed to climatic and environmental hazards.

There are several reasons behind people finding it difficult to migrate at times. Migration involves initial costs and social networks in the destination; so the loss of resources such as land back home and the uncertainties regarding the remuneration at the destination place huge demands on human, social, and financial capital of the migrants that the poor among them cannot meet (Gray and Mueller 2012). The poorest people in villages often do not have enough resources needed for migration in terms of investments, networks and physical capability – in effect, their households getting trapped in vulnerable rural spaces (Mallick and Etzold 2015). Such people, especially the elderly and those in poor health among them, end up depending on locally available resources, including post-disaster aid and support from the home community, the long-drawn recovery process leading to dependency and indebtedness (Mallick and Etzold 2015). While mobility helps people cope with disasters and their long-term effects, the link between short-term post-disaster moves and permanent migration can be rather unclear and complicated (Mallick and Etzold 2015, Penning-Rowsell et al. 2013). Another reason that Black et al. (2014) suggest is that in the aftermath of disasters there could be

changes in the local labour market that might encourage or discourage migration. Black et al (2014) further argue that there could be reconstruction after disasters, leading to an economic buzz, creating jobs, benefitting local people, though not necessarily those affected by the disaster. Such reconstruction activity after Hurricane Katrina, for instance, attracted undocumented Hispanic migrant workers, who were made to work at lower wages compared with that of local workers (Fletcher et al. 2007).

One local example cited in this regard is that of floods in Bangladesh, contributing to better agricultural wage rates in the long term (Banerjee 2007). The need for replanting crops could open up the labour market, making migration less likely. On the contrary, environmental events could also lead to lower farm productivity or wages, forcing poor people to migrate for work. The qualitative analysis shows the trend of landless and marginal farmers migrating more than others in the in the aftermath of weather uncertainties and associated losses. At the same time, the quantitative analysis does not show any significant relationship between flood and migration. Possibly such a lack of connection could indicate different trends of mobility and immobility cancelling out one another.

The notion of people being trapped in hazard-prone places is a relatively new one in climate- and environment-related migration. It is not only resource constraints, socio-economic factors, and policy barriers that limit adaptation choices, but also psychological factors, practices and perceptions of climate variability (Dang et al. 2014). Sometimes people just may not want to move despite the risks involved in staying at a vulnerable place (Black and Collyer 2014: 52). Sometimes people opt to stay back no matter what. In their Bangladesh study, Penning-Rowsell et al. (2013) argue that people are rooted to their places for their livelihood, housing, leaving only the landless and men within families move to work in farms elsewhere for daily wages. One example is the case of Gabura, where in an initial focus group discus-

sion, the villagers described how Cyclone Aila in 2009 left the place inundated, salinised, and thereby barren for years to come. Men had to migrate for many months. Still they preferred to live there as it was home (Martin 2015). Gardner (2009: 233) notes that people in Bangladesh in general have a strong sense of rootedness and home.

The sense of rootedness is characteristic of rural communities elsewhere as well. In the Northwest Costa Rican context, Warner et al (2015) shows that farmers perceived rice production as an identity, and to maintain that they had to limit their adaptation choices. For households that did not have enough water, adaptation meant decreased rice-market access. They become trapped by their inability to reduce their vulnerability (Warner et al 2015). As Collins (2013) argues such slow-onset environmental crises become a part of life and people adapt to them *in situ*. Even when displacement is likely after a shock, accumulated impacts can produce "acceptance, adaptation and resilience" *in situ* until deterioration of assets severely limits even the option to stay back (Collins 2013: S114). Studying rainfall variability, food insecurity and migration in Guatemalan mountain communities, Milan and Ruano (2014) have reported on the local people's experiences of climatic conditions worsening, affecting food production in the last 20 years. With reducing options for local livelihood diversification and limited migration opportunities, they run the risk of becoming stuck in a place vulnerable to climate change. As Penning-Rowsell et al. (2013) has noted in the context of Bangladesh, despite the major hazards and their threats, permanent movement/migration is limited, and that all movement is to some extent reluctant.

Whether people state it explicitly or not, migration can be interpreted as a strategy that helps them offset losses suffered in climatic and environmental stresses and shocks and be prepared better for future stresses and shocks. However, whether such migration leads to adaptation depends on the policy environment in the country. A textual analysis of relevant policy doc-

uments, however, shows that though urban migration is an inevitable part of Bangladesh's economic growth, its role as a climate change adaptation strategy or its links with hazards and local vulnerabilities are often not acknowledged at a policy level. The thesis argues that policies need to be more proactive so that migration does not become maladaptive or people unable to move out get trapped in places exposed to climate- and environment-related hazards.

9.3 Migration as adaptation

In Bangladesh's case, recent literature has reiterated that high levels of rural poverty coupled with rapid urban growth drives migration (Muzzini and Aparicio 2013, BBS 2013, Marshall and Rahman 2013). Still such migration arguably has a climate and environment nexus as changes and uncertainties affect livelihoods. In a country exposed to various hazards and extreme weather (Harmeling, 2012), dubbed as a climate change hotspot (Haq 2001; Huq and Ayers 2008) with a high population density (BBS 201), widespread poverty (World Bank 2013), and a heavy dependence on natural resource-based primary livelihoods, human impacts of climatic stresses and shocks get amplified (Agrawala et al. 2003). To offset this impact, people living in climate-sensitive areas increasingly adopt secondary livelihoods that are not depended directly on natural resources (Ahmad 2012), a trend that leads to an increase in urban migration (Afsar 2003, Muzzini and Aparicio 2013, Planning Commission 2011).

There are several examples of people using migration to offset these impacts of poverty. Villages affected by droughts, especially in northern Bangladesh, escape the lean period between harvests called *monga*, marked by poverty and food insecurity (Findlay and Geddes 2011, Etzold et al 2013). Landless labourers, mostly boys and men from *monga*-affected areas, often migrate to cities and better-off villages in search of work (Siddiqui 2009). While the cli-

mate- and environment-related migration in Bangladesh shows these characteristics described in the literature, it also demonstrates that networks play a key role (Bilsborrow and Okoth-Ogendo 1992, Munshi 2003, Schmidt-Verkerk 2011, Foresight 2011, Lu et al 2012, Warner et al 2012, among others).

Looking at their multi-dimensional causality, changing migration patterns can be explained as one among many ways that individuals, households and communities use to escape poverty (Kniveton et al 2008). In a matrix of poverty and inequality, as the environment changes and resources get used up, climate along with other socio-economic, environmental, political, and demographic factors, could drive migration (Lonergan 1998). Disasters, development projects, environmental degradation, shortages, poverty and market changes, can often act together, to amplify people's vulnerabilities (Stal and Warner 2009).

In short, the thesis shows that while climate and environment-related stresses and shocks influence human movement is many different – and complex – ways. Studies have found that people often move for short periods over short distances as a result of disturbances to their habitats, safety and livelihoods (Poncelet 2008, Findlay and Geddes 2011, Mueller and Gray 2012, Etzold et al 2013). However, such hazards often do not affect, or sometimes decrease long-distance moves (Gray and Mueller 2012, Henry et al. 2009b, Kniveton et al. 2008).

In places that experience high levels of climate-related mobility such as Bangladesh (Foresight 2011), migration becomes foremost a livelihood strategy amidst multiple opportunities, stresses, shocks and, above all, uncertainties – an activity interwoven with other societal processes (McLeman and Smit 2006). "If we assume that climate-stimulated migration is not simply a random or wholesale outpouring of people from an exposed area, migration can be seen as one possible manifestation or outcome of adaptive capacity in the light of exposure to some form of climatic stress" (McLeman and Smit 2006: 35). In such a scenario adaptation

may be defined as an adjustment in ecological, social or economic systems as a response to observed or expected changes in climatic stimuli; and the effects and impacts of such stimuli to alleviate adverse impacts of change, or take advantage of new opportunities (McCarthy et al 2001, Adger et al 2005).

Migration can be a good strategy for adaptation to environmental change, an "extremely effective" way to gain long-term resilience (Foresight 2011:10). For poor people, the lack of capacity to adapt to environmental risks or hazards may be interconnected with population displacements. As McLeman and Smit (2006) argue, the Dust Bowl migrants of rural Oklahoma in the 1930s were displaced due to the combined effect of crop failure following drought, land use, tenancy, social networks, and ability of family members to migrated – factors that together influenced their adaptive capacity. Recent literature argues that far more than a coping strategy, migration can be a positive adaptation measure (Barnett & Webber, 2010). Still it is often difficult to determine whether climate- and environment-related human mobility indicates successful adaptation or a failure to adapt *in situ* (Warner and Afifi 2014).

The qualitative analysis shows that villagers in districts exposed to climate- and environment-related stresses, shocks and uncertainties are diversifying their traditional livelihood strategies by migrating. Although the migrants' primary motivation is better livelihoods and better income, climatic and environmental factors work in the background, often influencing their migration decisions, or sometimes making migration necessary. As migration contributes to better and safer lives and livelihoods, especially in the context of changing or uncertain climatic factors, it may be argued that migration becomes an effective form of adaptation.

9.4 Scope for follow-up studies

In a context of climate change, this thesis probes to what extent climate and environment-related stresses and shocks influence villagers' decisions to stay put or move out of their

place in Bangladesh. Based on neoclassical migration theories, influenced by social psychology and behavioural economics, and informed by climate sciences, the study also includes a strong policy element with wider practical implications. While debating and negating some old notions of climate-induced mass migration largely based on neo-Malthusian economics, this piece of research underscores the multi-causal nature of migration. Even while migration is primarily driven by livelihood and income needs, climatic and environmental stresses and shocks influence people's migration decisions. Even though people seldom attribute their movements to these factors. In that sense, it places migration as an effective adaptation strategy and looks at the broader policy implications of such a notion. In this context, the research potentially opens up opportunities for enquiries on several fronts.

Firstly, the research considers cognitive aspects of decision-making amidst uncertain and incomplete information on weather, climate and their impacts on ground. The thesis acknowledges advances in climate modelling that predict a wetter future for the upstream areas of the three major rivers whose low-lying delta makes up much of Bangladesh – thereby making large parts of the country hazard-prone. It offers possibilities to study three dimensions of this phenomenon. It is important to understand the future climate on Bangladesh based on climate models and its impact on the hazard profile of the country mentioned in chapter 3; its potential repercussions on livelihoods and safety of people; and their influence on people's migration decisions and patterns.

Secondly, this thesis argues that villagers in Bangladesh migrate for better livelihoods, and use migration as a response to climatic stresses and shocks as an adaptation or coping strategy. Most of the movements are reported to be within the country and if facilitated appropriately, such internal migration – along with international migration – can be an effective adaptation strategy as the thesis shows. Such movements can help build individuals' and commu-

nities' adaptive capacity to future environmental and climatic hazards. Migration happens in the context of a growing city-centred economy that promotes remittances to villages. An area that requires further studies is the adaptive nature of migration, the efficacy of migration as an adaptive strategy, and factors that aid or inhibit movements of people.

Thirdly, future studies could probe how policies can help migration and boost its adaptation potential. A textual analysis of current and recent policies concerning climate change, development and poverty alleviation, and disaster management in Bangladesh shows that the economic and adaptive roles of internal migration are often not included in policy documents. More than that, as explained in the policy analysis part of the thesis, these policies tend to tacitly discourage migration even when an overall development strategy of city-based growth promotes rural-urban migration. This ambiguity and its impacts are something that requires closer research attention.

Fourthly, a related theme for further enquiries is restrictions to mobility. The thesis shows that hazards and their aftermath could involve serious implications of people's mobility or, even more seriously, lack of it. It indicates that a large number of people might be trapped under risky circumstances, exposed to climate- and environment-related hazards. While it may be argued that internal and external factors could in effect trap people in vulnerable places, mobility could help them escape hazards, and offset their impacts. Mobility involves the freedom to seek opportunities to improve livelihoods, living standards and services such as health care and education – succinctly put, safer and more productive life in more responsive communities (UNDP 2010). Often disasters take away resources and assets that contribute to such mobility.

Further, from a local perspective, there is a need to understand the influence of climatic and environmental stimuli on people's links and rootedness with their place and probe into cogni-

tive processes that define these links. The challenge here is to understand to what extent people stay put in a hazard prone place and what it takes to move out; and if they are unable to move out, are they likely to get trapped; and to what extend uncertain and fuzzy elements of climate projections can be translated into actionable policy interventions. Such an in-depth knowledge would be beneficial to local communities trying to deal with hazards and policy makers addressing emerging challenges concerns and opportunities. Particularly, the inevitable loss and damage – climate change effects that people cannot adapt to or cope with – is a matter or emerging policy interest (UNFCCC 2013, IPCC 2014). Immobility related to loss and damage, therefore, is a field for potential future enquiry.

Fifthly, a weakness in this thesis is that it does not look closely enough at short-term, short-distance moves, especially after hazards, which apparently constitute a major share of climate- and environment-related mobility as the literature shows. The quantitative survey included questions on short-term moves but the data gathered was not detailed enough for analysis. While it may be important to study the duration, distance and frequency of movements after these events, attention should also be paid to understand the benefits and costs involved in these moves. Staying or moving – over different spans of time and space – could be a response mediated by hazard experiences and risk perceptions as the qualitative study shows.

Overall, there is scope for interdisciplinary research, especially on extreme and uncertain climate and weather events and the possibility of people living in vulnerable settings – places and socio-economic circumstances – becoming unable to adapt or cope with the changes in their climate and environment. Climate and oceanographic models could shed more light on extreme precipitation, sea level rise and cyclone intensity, trajectories and storm surges, and contribute to research on their human impact. A step ahead, there could be closer examina-

tion of how effective risk appreciation and communication could be promoted under such circumstances.

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Annexes

1

Qualitative questionnaire

1.1 Village-level community survey

Introductory information
Name of the Village/ Ward No
Name of union
Name of thana
Name of district
GPS location
Any change in name or status of Village since 1970? (Yes/No)
If changes occurred mention those:

1. Physical characteristics

1.1. Total number of population:
1.2. Total number of arable land of the Village:
1.3. Total amount of non arable land of the village:
1.4. Total number of Khas ponds/ ditch/ marshland/? in the village:
1.5. Educational qualification of the villagers:

Educational qualification	Percentage (%)
Educated	
Half - Educated	
Less- Educated	
Able to sign (literate)	
Illiterate	

1.6. What are the sources of clean water?

Tube well	
Well	
Pond	
Rain water	

Others	

1.7. When scarcity of water is experienced by the villagers?
1.8. Number of landless people in the village:
1.9. What are the sources of cooking fuel in the village?

Firewood	
Paddy	
Cow-dunk/Muck	
Chaff/ Husk of grain	
Jute-stalk	
Tree leafs	
Chaff wood	
Others	

1.1. Is there any government owned or private forest in the village? If so, percent% of total area (in Square km)?

2. Educational facilities

2.1. How many primary schools are there in the village? List them
2.2. Queries for each Primary School

No	Name of the School	When did it open (if after 1970)? [year]	Type	Are there any years in which the school was temporarily closed? [In years]	Reason for close?
1					
2					
3					
4					
5					

Types

Bangla medium (Government)	1

Bangla medium (Non-government)	2
Madrasha	3
Kindergarten	4
English Medium	5
Non formal/Vocational school	6

2.3. If there is no primary school, how far away is the nearest one? [km]

2.4. List all the secondary schools in the village.:

2.4.1. Queries for each one

No	Name of the School	When did it open (if after 1970)? [year]	Type	Are there any years in which the school was temporarily closed? [In years]	Reason for close?
1					
2					
3					
4					
5					

Types

Bangla medium (Government)	1
Bangla medium (Non-government)	2
Madrasha	3
Kindergarten	4
English Medium	5
Non formal/ Vocational school	6

2.5. If there is no secondary school, how far away is the nearest one? [km]

3. Health facilities

3.1. List all clinics, dispensaries and hospitals in the village. Queries for each one:

No	Name	When was it established (if after 1970)? [year]	facilities	Are there any years in which the facility was temporarily closed? [In years]	Reason for closure
1					
2					
3					
4					
5					

Clinics	1
Hospitals	2
Dispensaries	3
Homeopathies	4
Ayurvedic physician	5
Religious healers	6

3.2. List all pharmacies in the village. Queries for each one:

No	Name of the pharmacy	When did it open (if after 1970)? [year]	facilities	Are there any years in which the facility was temporarily closed? [In years]	Reason for close?
1					
2					
3					
4					
5					

3.3. If there is no clinic, hospitals, pharmacy, dispensary, Ayurvedic physician, homeopathies in the village, how far away is the nearest one? [km]

4. Population

4.1. How many religious communities or ethnic groups live in the village?

List of the 4 largest ethnic groups

Communities/ ethnic groups	Percentage (%)	Total Household	How many years are they living in the village?	**Decrease (1) Increase (2)**
Muslims				
Hindus				
Christians				
Buddhists				
Ethnic				
Others				

4.2. Has any new community moved in the village?

4.2.1. Is there a period in which they came or left large number? [Y/N]

4.2.2. When this period did begin and end? [year]

5. **Diseases**

5.1. Please tell us about the major diseases that have affected the village since 1970.

no	Name of diseases	At present which diseases are frequently occurring?	In which year did the disease appear?	Which diseases frequently occurred in 20 years before?	Year of disappearance of these diseases
1	Diarrhoea				
2	Hepatitis				
3	Arsenic				
4	Skin Diseases				
5	Dengue				
6	Kala-azar				
7	TB				
8	Malaria				

Year	Reasons (Drought ,Excessive rain, Shortage of rainfall, flooding, Storm/cyclone, damage or attack by pests, river erosion others	Did those affected sell livestock? [Y/N]	Did those affected sell possessions? [Y/N]	Did people leave the village? [Y/N]	Did people go hungry? [Y/N]	Did people adjust their diet? [Y/N] such as eating potato, Muri (fried rice), Chira instead	Was there mutual assistance ? [Y/N]	Other

9	Leprosy				
10	Small pox				
11	Others				

6. Harvest failures

6.1. Are there any years since 1970 when the harvest has been particularly bad? [Y/N]

Ask in decade: (2012-2001); (2000-1990); (1989-1980); (1979-1971)

6.2. In which years the harvest failures were worst?

						of rice		

7. Principal economic activities

7.1. Please tell us about the principal economic activities in the village since 1970.

Profession	Most (over 80%),	Many (over 50%),	Some (over 10%)	Hardly any (under 10%)]	**Before 1970**	**Year after 1970 (When?**
Agriculture						
Fishing						
Shrimp culture						
Poultry						
livestock						
Fish farming						
Craft production						
Commerce						
Industry/mining						
Services						
Plantation business						
Others						

7.2. How many crops are cultivated in a season in this village?

7.3. Please tell us about the principal crops grown in the village since 1970.

Crops name	When did the production of the crop start? [year]	Is it mainly grown for consumption or sale, or both?	If mainly sold, when did it start to be sold [year]
Paddy			
Jute			

Wheat			
Pulse			
Potato			
Tobacco			
Vegetables			
Sugarcane			

7.4. Please tell us about the agricultural technology used in the village since 1970.

Agricultural technology	Is this used? [Y/N]	When did the villagers started using it [year]	Is this widely used [Y/N]	When did it become widely used [year]
Tractors/ Power Tiller				
Pump Irrigation				
Chemical fertilizers				
Threshing Paddy machine /Grinding mill				
Rice processing machine				
Spices processing machine				
Hybrid Seeds				
Others				

7.5. Forms of land tenure found in the village?

Ownership-	Percentage	Farming in	Sharecropping/Tenants	Mortgaged land

Possession / land tenure system	(%) of own land	Rented or mortgaged land (%)	farming (%)	(%)
Present Situation				
20 years before				

7.6. Related to non arable land

Non arable land	Yes	No	Year
Is there non arable land in the village?			
Has there been any change since 1970?			
In which year the changes were observed?			
Did the size of non-arable land get larger or smaller?			

7.7. Is there any change in land use pattern?

Got Waterlogged	
Lack of irrigation water	
Intrusion of saline water	
Shrimp culture	
Homestead in the cultivable land	
Brickfield in the cultivable land	
others	

7.8. Has farming in the village been affected by the weed? (Yes/No)

7.8.1. When did the weed problem start? [year]

7.8.2. Has it been eradicated? [Y/N]

7.8.3. If Y, when? [year]

8. Employment

8.1. Is it possible to find paid work in the village?

8.1.1. Which sector?

8.1.2. What activity?

8.1.3. What is the name of the employer/company?

List each enterprise offering paid work:

Name of the employer/ company	When did the Enterprise start? [year]	When did the enterprise finish? [year]	How many are employed? [>50 (More than 50) ; 10-50; (10 t0 50) <10 less than 10	Is employ-ment tem-po-rary/seasonal / permanent? [Y/N]	Have people from other village moved to the vil-lage to take up this employment?

8.2. Are there any sources of paid work in the village that have existed since 1970, but no longer exist? List each enterprise that offered paid work:

8.2.1. Which sector?

8.2.2. What activity?

8.2.3. What was the name of the employer/company?

Name of the employer/ company	When did the Enterprise start? [year]	When did the enterprise finish? (year)	How many are employed? [>50 (More than 50) ; 10-50; (10 t0 50) <10 less than 10	Is employ-ment tem-po-rary/seasonal / permanent? [Y/N]	Have people from other village moved to the vil-lage to take up this employment?

8.3. Is it possible to find paid work close to the village? List each enterprise offering paid work:

8.3.1. Which sector?

8.3.2. What activity?

8.3.3. What is the name of the employer/company?

Name of the employer/ company	When did the Enterprise start? [year]	How far away is the enterprise? [km]	How many are employed? [>50 (More than 50) ; 10-50; (10 t0 50) <10 less than 10	Is employment temporary/seasonal / permanent? [Y/N]	Have people from other village moved to the village to take up this employment?

8.4. Are there any sources of paid work close to the village that existed after 1970, but no longer exist? List each enterprise that offered paid work:

8.4.1. Which sector?

8.4.2. What activity?

Name of the employer/ company	When did the Enterprise start? [year] if abolished, which year?	How far away is the enterprise? [km]	How many are employed? [>50 (More than 50) ; 10-50; (10 t0 50) <10 less than 10	IS employment temporary/ seasonal/ permanent? [Y/N]	Have people from other village moved to the village to take up this employment?

8.4.3. Major professions (Past and Present)

Profession	Exist before (20 years) but no more	Present / Still exist
Day labour		
Shopkeeper		
Fisherman		
Rickshaw/ Van puller		
Driver of auto (C.N.G, Scooter, Bus, Truck)		
Boatman		
Confectioner/ sweet maker		
Milkman		
Potter		
Blacksmith		
Weaver		
Ghee seller		
Oil seller (ferry)		
Scrape collector		
Mason		
Carpenter		
Mobile phone Booth, Flexi load business		
Honey collector		
Teacher		
Farmer		
Share cropper		

9. Development projects and associations

9.1. How many development projects are currently operating in the village?

For each project:

Name of the project (Government/Non-government/ N.G.O operated) If Govt. Project, name of ministry/Department	When did it start? [year]	What sector? [agriculture, livestock, credit, health, education, other]

9.2. Are there any development projects in the village since 1970 that are no longer operating? [Y/N]

Name of the project (Government/Non-government/ N.G.O operated) If Govt. Project, name of ministry/Department	When did it start? [year]	When did it finish? [year]	What sector? [agriculture, livestock, credit, health, education, other]

9.3. Are there any village associations or co-operatives? [Y/N}

For each association:

Name of the associations or co-operatives	When did it start? [year]	Is it for men, women, or both?	What sector? [agriculture, livestock, credit, health, education, other]

9.4. Are there any village associations that used to exist since 1970, but no longer exist? [Y/N}

For each association:

Name of the associations or co-operatives	When did it start? [year]	When did it finish? [year]	Is it for men, women, or both?	What sector? [agriculture, livestock, credit, health, education, other]

9.5. Are there any Diaspora associations or associations of migrants? [Y/N}
For each association:

Name of the association	Which country/ Where is it based?	When did it start? [year]	What sector? [cultural activities; economic support to the village; integration of migrants at destination]

9.6. Are there any diaspora associations or associations of migrants that used to exist since 1970 but no longer exist? [Y/N}
For each association:

Name of the association	Which country/Where is it based?	When did it start? [year]	When did it finish? [year]	What sector? [cultural activities; economic support to the village; integration of migrants at destination]

10. Village infrastructure

10.1. Do you have the following in the village?

Name	Yes	No	If No, how far away is the nearest place you can find it? [km]	If Yes, since when has it been available [year]
Grazing land				
Safe drinking water supply				

Piped drinking water				
Irrigation system				
Grinding mill				
Cinema				
Credit institution				
Electricity				

10.2. Do you have a market in the village? [Y/N]

10.3. When did the local market first start? [year]

10.4. Is the market daily or weekly?

10.5. Has the frequency changed? [year]

10.6. Can you buy the following in the village?

Goods	Yes	No	If No, how far away is the nearest place you can find it? [km]	If Yes, since when has it been available [year]
Cooking oil				
Salt				
Sugar				
Soap				
Gasoline				
Batteries				

10.7. Does the village have a paved road? [Y/N]
10.7.1. If N, how far away is the nearest one? [km]
10.7.2. If Y, when was it built? [year]
10.8. Does the village have motorized public transport? [Y/N]
10.8.1. If N, how far away is the nearest place? [km]
10.8.2. If Y, when was it first available? [year]

10.9. Does the village have a boat landing? [Y/N]
10.9.1. If N, how far away is the nearest place? [km]
10.9.2. If Y, when was it first available? [Year]

1.2 Focus group discussion

Village:
Union:
District:

Livelihood

Family	
Upper class	
Middle class	
Lower class	

1.1. What changes have occurred in livelihood of your family in last 40 years?

1.2. How many livelihoods were there and what were these?

1.3. What did your ancestors (father, grandfather) do?

1.4. What were your occupation before and what are you doing now?

1.5 What are the common problems of this village in perspective of livelihood, which are not related to environment and climate change?

No	**Livelihood**	**Common problems**

2.

2.1. What are the common problems of the people in this village? (Except Environment)…….

2.2. Have the villagers ever thought of migration to solve any of these problems?

2.3. What kind of changes has taken place in the climate in this area over the last 40 years? What have you heard from your parents, grandparents and neighbours?

2.4. Which was the worst natural calamity people have ever seen and/or faced in their life? (Area specific)

3. The chronological events occurred due to climate change in the past:

No	**Name of the incidents**	**Year**	**Time/ Month**	**Death incidentals**	**Damage of individual property**	**Losses of government /non-government infrastructure**

3.1. We heard about workable indigenous knowledge with regard to weather forecasting? What were/ are those?

3.2. Does indigenous knowledge work now? (Y/N)

3.3. What sort of thing you find different from indigenous knowledge?

4. What is the major climate change induced events the upper/middle/lower class family faces now?

No	**Family**	**Impacts/Result and responses**
	Upper class	
	Middle class	
	Lower class	

4.1. Generally what sort of natural calamities people face?

Please explain the variability of climate change

Rainfall

Quantity/Degree/intensity	
Duration	
Present intense months	
Past intense months	
Problems faced in agriculture production/cultivation	
Changes needed to bring in cultivation	
Problems faced in other occupation except agriculture	
What steps have you taken deal with this problem	

Warming

Quantity/Degree/intensity	
Duration	
Present intense months	
Past intense months	
Problems faced in agriculture production/cultivation	
Changes needed to bring in cultivation	
Problems faced in other occupation except agriculture	
What steps have people taken to deal with this problem	

Drought

Quantity/Degree/intensity	
Duration	
Present intense months	
Past intense months	
Problems faced in agriculture production/cultivation	
Changes needed to bring in cultivation	
Problems faced in other occupation except agriculture	
What steps have people taken to deal with this problem	

Cyclone

Quantity/Degree/intensity	
Duration	
Present intense months	
Past intense months	
Problems faced in agriculture production/cultivation	
Changes needed to bring in cultivation	
Problems faced in other occupation except agriculture	
What steps have people taken to deal with this problem	

Flood

Quantity/Degree/intensity	
Duration	
Present intense months	
Past intense months	
Problems faced in agriculture produc-	

tion/cultivation	
Changes needed to bring in cultivation	
Problems faced in other occupation except agriculture	
What steps have people taken to deal with this problem	

River Bank Erosion

Quantity/Degree/intensity	
Duration	
Present intense months	
Past intense months	
Problems faced in agriculture production/cultivation	
Changes needed to bring in cultivation	
Problems faced in other occupation except agriculture	
What steps have you taken deal with this problem	

4.2. Can you rate people's current situation with regards to your resources to carry out different livelihood activities? (go through different livelihood responses)**.**

I

4.3. Please rate how threatening the following problems are to the sustainability of people's livelihoods:

Problems	**Not at all threatening (1)**	**Little threatening(2)**	**Threatening (3)**	**Threatening to a great extent (4)**	**Extremely Threatening (5)**
Flooding					
Drought					

Rainfall					
Increased temperature					
River bank erosion					
Water stress of plants					
Salinization of water resources					
Salinization of soil					
Increased pests					
Increased disease load					
Erosion of soil					

4.4. If need be, please elaborate how people's livelihood has been affected by rainfall/warming/ drought/ cyclone/ river bank erosion?

4.5. Please rate how likely people think the following problems are to occur in the next 10, 20, 30, 50 years:

Problems	**Not at all (1)**	**Sometimes (2)**	**(3) Regular Intervals**	**(4) Frequent**	**All the time (5)**
Crop failure due to flooding					
Cop failure due to drought					
Complete salinity of water resources					
Complete salinity of					

soil					
Loss of livelihood potential due to loss of land to erosion					
Inability of getting produce to market due to flooding					

4.6. What are the problems people face to sustain livelihood?

4.7. What changes people have taken so far in their livelihood due to climate change induced events?

Changes of job: temporary/ permanent	
Profit/ loss due to change in occupation	
Increase capacity of occupation by following adaptation strategy	
What kind of adaptation strategy you follow	
How effective are they (adaptation strategy)	
How costly (economic and social) are they?	

5. What are the general problems people face in this locality due to climate change induced events?

Scarcity of drinking water	
Insecurity of women	
Irregular or stagnated academic curriculum in educational institutions	
Water logging	
Intensification or spread of diseases	
Infrastructural damage	

Others	

6. What are the causes of people's migration from this area? How migration has been influenced by climatic events?

1.3 Individual semi-structured interview

1. Basic Household Information

Serial No	Relationship with the Household head	Age	Education	Female 1 Male 2	Income source	Monthly Income
1.	H Head					
2.						
3.						
4.						
5.						
6.						
7.						
8.						
9.						
10.						
Total Number						Total Family Income =

If any family member is migrant, then put an asterisk (*) beside him/her.

Code

Relationship with the Household Head	**Education**
1. Wife	1. Not Literate
2. Husband	2. Can sign
3. Daughter	3. Class 1 to 5
4. Son	4. Class 1 to 5
5. Mother	5. SSC/ Dakhil/O' Level/ Vocational SSC
6. Father	6. HSC/Alim/A' Level
7. Sister	
8. Brother	

2. Land Holdings Description

Homeland	**Agricultural Land**	**Non-agricultural**	**Pond**

2.1 What is the portion at the pond in case of joint ownership?.....

2.2 Other Properties apart from land.

Properties	**Quantity/Number**	**Value**
Shop Owner		
Business in leasing shop		
Rice Mill/ Threshing Machine		
Irrigation Pump		
Power Tiller		
Chicken Farm		
Business of agricultural Product (Seeds, Fertilizer)		
Fish Trader		

Fish Farm		
Trees/ Fruits Orchard		
Cattle Farm		
Others ……		

3. Migrants' Profile

Serial No	**Destination**	**Years of Migration (staying period)**	**Cost**	**Types of Job**	**Skill**

4. Livelihood

4.1 What changes have occurred in livelihood of your family in last 40 years?

4.1.1 How many livelihoods were there and what were these?

4.1.2 What did your ancestors (father, grandfather) do?

4.1.3 What were your occupation before and what are you doing now?

4.2 Were your family members indigenous/ inhabitants of this area or migrants?

4.2.1 How long ago they came?

4.2.2 From where did they come?

5. Cognitive

5.1 What are the common problems of your family?

5.1.1 Have you ever thought of migration to solve any of these problems?

5.2 What kind of changes has taken place in the climate in your area over the last 40 years? What have you heard from your parents, grandparents and neighbours?

5.2.1 Which was the worst natural calamity you have ever seen and/or faced in your life? (Area specific)

5.2.2 We heard about workable indigenous knowledge with regard to weather forecasting? What were/ are those?

5.2.3 Does indigenous knowledge work now? (Y/N)

5.2.4 What sort of thing you find different from indigenous knowledge?

5.3 What is the major climate change induced events you or your family face now

Please explain the variability of climate change

Rainfall

Quantity/Degree/intensity	
Duration	
Present intense months	
Past intense months	
Problems faced in agriculture production/cultivation	
Changes needed to bring in cultivation	
Problems faced in other occupation except agriculture	
What steps have you taken deal with this problem	

Warming

Quantity/Degree/intensity	
Duration	
Present intense months	
Past intense months	
Problems faced in agriculture production/cultivation	
Changes needed to bring in cultivation	
Problems faced in other occupation except agriculture	
What steps have you taken deal with this problem	

Drought

Quantity/Degree/intensity	
Duration	
Present intense months	
Past intense months	
Problems faced in agriculture production/cultivation	
Changes needed to bring in cultivation	
Problems faced in other occupation except agriculture	
What steps have you taken deal with this problem	

Cyclone

Quantity/Degree/intensity	
Duration	
Present intense months	

Past intense months	
Problems faced in agriculture production/cultivation	
Changes needed to bring in cultivation	
Problems faced in other occupation except agriculture	
What steps have you taken deal with this problem	

Flood

Quantity/Degree/intensity	
Duration	
Present intense months	
Past intense months	
Problems faced in agriculture production/cultivation	
Changes needed to bring in cultivation	
Problems faced in other occupation except agriculture	
What steps have you taken deal with this problem	

River Bank Erosion

Quantity/Degree/intensity	
Duration	
Present intense months	
Past intense months	
Problems faced in agriculture production/cultivation	
Changes needed to bring in cultivation	
Problems faced in other occupation except	

agriculture	
What steps have you taken deal with this problem	

5.4 Can you rate your current situation with regards to your resources to carry out different livelihood activities? (go through different livelihood responses)

5.5 Please rate how threatening the following problems are to the sustainability of your livelihoods:

Problems	**Not at all threatening (1)**	**Little threatening (2)**	**Threatening (3)**	**Threatening To a great extent (4)**	**Extremely Threatening (5)**
Flooding					
Drought					
Rainfall					
Increased temperature					
River bank erosion					
Water stress of plants					
Salinization of water resources					
Salinization of soil					
Increased pests					
Increased disease load					
Erosion of soil					

5.6 How satisfied are you with the difference between your current situation and your ideal situation with regards to resources?

Not at all satisfied	1
Little satisfied	2
Satisfied	3
Satisfied to a great extent	4
Extremely satisfied	5

5.5 If need be, please elaborate how your livelihood has been affected by rainfall/warming/ drought/ cyclone/ river bank erosion?

5.6 Please rate how likely you think the following problems are to occur in the next 10, 20, 30, 50 years:

Problems	**Not at all (1)**	**Sometimes (2)**	**(3) Regular Intervals**	**Frequent**	**All the time (5)**
Crop failure due to flooding					
Cop failure due to drought					
Complete Salinization of water resources					
Complete Salinization of soil					

Loss of livelihood potential due to loss of land to erosion					
Inability of getting produce to market due to flooding					

5.4.1 What are the problems you face to sustain livelihood?

5.4.2 What changes you have taken so far in your livelihood due to climate change induced events?

Changes of job: temporary/ permanent	
Profit/ loss due to change in occupation	
Increase capacity of occupation by following adaptation strategy	
What kind of adaptation strategy you follow	
How effective are they (adaptation strategy)	
How costly (economic and social) are they?	

6. What are the general problems you face in your locality due to climate change induced events?

Scarcity of drinking water	
Insecurity of women	
Irregular or stagnated academic curriculum in educational institutions	
Water logging	

Intensification or spread of diseases	
Infrastructural damage	
Others	

7. Causes of Migration and decision making

7.1 Why you or your family members migrated? Were migration influenced by any climate change induced events (rainfall, temperature, drought, flood, cyclone). Please elaborate.

7.2 What were the things or factors you or your family thought of before migration.

7.3 Who provided information of migration to you or your family?

7.4 What kind information was available to you before migration?

7.5 Who decided in family about member/s' migration

Serial No	**Father**	**Mother**	**Brother**	**Sister**	**Self**	**Wife**	**Sister in law**	**Brother in Law**	**Family**	**Others**

7.6 Who else (relatives, neighbours friends) played facilitating role in migration?

7.6. 1 How did he/ she play role? Please elaborate or choose from below

By giving money	
By providing information	
By giving job	
By giving information and job both	
By giving mental support	
By giving information on skill upgrading	

By supporting skill upgrading	
By providing information and support both for skill upgrading	
Others	

7.6.2 Did community play any role behind migration?

7.7 Why the whole family did not migrate?

8. Locus of Control

The fate of local people is in the hands of the people in power and there's not much that individuals can do about it.	**1**	**2**	**3**	**4**	**5**
The success of household is mostly determined by factors outside of your control					
the weather and commodity prices can make life difficult in the short term, but in the long run there is still a lot you can do to stay ahead of the game					
Many times I feel that I have little influence over the things that happen to me.					
No matter what things I try to make a living, the drought/flooding etc prevents them from working					

1 Strongly disagree; 2 Disagree; 3 Neutral; 4 Agree; 5 Strongly agree

9. **Self concept:**

9. 1 How often do people come to you for livelihood (including migration) advice?

Never	1
???	2
Sometimes	3
Frequent	4
All the time	5

9.2 How much influence do you think you have on other individuals when it comes to livelihood practices (including migration)?

No influence	1
Very Little influence	2
Little	3
Moderate influence	4
Significant influence	5

10. Risk and innovation:

10.1 Do you always one of the first in your area to change your livelihood in instances of stress and shocks. If yes, Why?

If no, please elaborate

10.2 Are you trying new livelihoods (such as migration) that aren't used a lot.

10.3 Are you willing to take more risks than other farmers in the area with respect to your production methods. If yes, why?

If no, please elaborate

11. Trust Advice

11. 1 For different livelihood responses: How much would you trust information on agricultural management from the following sources?

Institutions	1 No trust at all	2 Little trust	3 Moderate trust	4 Trust	5 Complete trust
Fellow households					
Local leaders					
Industry groups					
Agronomists					

Agribusiness					
NGOs					
National Government					
Local Government					
Contractor					

11.2 To what extent is your decision to change livelihoods is influenced by the behaviour of your neighbouring households, friends, family?

No influence	1
Very Little influence	2
Little influence	3
Moderate influence	4
Significant influence	5

2

Quantitative questionnaire

SURVEY ON MIGRATION AND ENVIRONMENTAL CHANGE IN BANGLADESH 2012

Biographic Questionnaire
RMMRU / University of Sussex

IDENTIFIER: Household |__|__|__| Individual: |__|__|__|

VILLAGE/WARD:_____

UNION: _____

THANA: _____

DISTRICT: _____

FAST READING:	**DATE :** |__|__| |__|__| |__|__|__|__|
IN-DEPTH READING:	**DATE :** |__|__| |__|__| |__|__|__|__|
CODIFICATION :	**DATE :** |__|__| |__|__| |__|__|__|__|
DATA ENTRY:	**DATE :** |__|__| |__|__| |__|__|__|__|
COHERENCE TESTS / CORRECTIONS:	**DATE :** |__|__| |__|__| |__|__|__|__|
	DATE : |__|__| |__|__| |__|__|__|__|
	DATE : |__|__| |__|__| |__|__|__|__|
	DATE : |__|__| |__|__| |__|__|__|__|
INTERVIEWER'S NAME: _____	**NO.** |__|__| **DATE :** |__|__| |__|__| |__|__|__|__|

STARTING TIME _ _ hr _ _ min

PRESENTATION OF THE STUDY TO THE RESPONDENTS

Hello, my name is …….... I am taking part in a study on climate change-related migration in Bangladesh.

Before we start, I would like to briefly present the study to you and inform you about your rights.

This study has been organised by the Refugee and Migratory Movements Research Unit at the University of Dhaka and the University of Sussex in Britain.

WHY THIS STUDY? ➔

- The main aim of this study is to strengthen the ability of the Government of Bangladesh to understand, **plan for and respond to migration in the future**, whilst reducing vulnerability, and building the resilience of the people of Bangladesh to the impacts of climate change
- The **dimensions and causes** of migration remain poorly understood, including the extent to which it is influenced by climate change.
- The **impact of migration** on the living conditions of families or on the country's development has also not yet been adequately evaluated.
- With this study, which is organised by Bangaldeshi and British researchers, we would like to **produce statistical data** based upon the real life experiences of Bangladeshi people.
- The findings of this study will also be discussed on the occasion of **public debates**, bringing together citizens, researchers and political decision-makers. The ultimate objective of this study is hence to establish the link between real-life experience and migration and development policies.

HOW IS THIS GOING TO HAPPEN?

- To carry out this study **we meet people with very different migration experiences**: people who have always lived in this village, people who have lived in other places and who have returned, and also people who live currently away.

- A qualitative study has already been initiated, and has informed the development of this survey.

- Today, this survey concerns you, **your life**. There are questions about the places where you lived since your childhood, about your occupations, your family life, the trips and stays you may have experienced, etc. All these questions will allow us to study the relationship between the **fact of migrating or not migrating** and the conditions in which you live.

- Since everyone's experience is different, **the duration** of the interview varies between 30 min and one hour and a half, depending on the person.

RIGHTS AND CONFIDENTIALITY OF ANSWERS

- If a question makes you feel uneasy, **you are not obliged to answer**. You can stop the interview at any time.

- We guarantee that all the information you give us will be kept **confidential.**
- Your name and your address are not be recorded in the questionnaire – except your first name, so nobody will be able to identify you from the information that you give me

Before we start: **Do you have any questions?**

Once any questions are answered … Is it OK for me to continue with the interview?

INTRODUCTION COLUMN 1

Q0 – First name of the respondent: ……

Q1 – The respondent is: 1. A man **2.** A woman

To begin with, I would like to note the major events and periods of your life on this grid. We will begin at the time of your birth. Later we will look at these periods of life in some more detail.

Q1A – To start with, and to help us to set a time scale, could you tell me in which year you were born (or your age)? |_1_|_9_|__|__|

GRID: Locate year of birth in the grid, note 0 in the columns titled "age", and fill in these columns by retracing the age till the current age of the respondent.

HISTORY OF HOUSING LIVED IN FOR AT LEAST 1 YEAR COLUMNS 3.1 AND 3.2

Now we will talk about each HOUSE OR APARTMENT in which you lived for at least one year, starting from your childhood till now. We are interested also in moves you have made within the same town or village…

"House or apartment" includes all kinds of accommodation, including rented rooms, stays in hostels, staying with family members, etc. Note housing periods of at least one year in the grid. If there is space, note shorter periods in the "comments and specifications" column, e.g. "living for 5 months with uncle in Dhaka".

- *1st house:* **When you were born, in which town/village did you live? In which district?**

  GRID: at age 0, note in CAPITAL LETTERS the name of the town/village and of the district where the 1st house was located.

  Until when (what age) did you stay in this house?

  GRID: Locate the year of housing change and draw an arrow indicating the time spent in the first house.

- *2nd house:* **And then, where did you live? And until when did you stay in this house?**

  GRID: Note in CAPITAL LETTERS the name of the town/village and the district where the 2nd house was located and the year of moving into this new place. Ascertain the time spent in this second house and draw an arrow up to the 3rd house…

- *PROCEED in this way for each house until the current house and **go to Q2**.*

Q2 – Is there a place which you would consider to be your village or your town of origin in Bangladesh? **1.** Yes
2. No ➔ ***Q3***

Q2V – What is the name of this locality? ……

Q2D – In which district is it located? |__|__| *see list of district codes*

Q3 –Which group would you say you belong in Bangladeshi society?

0. None **1.** Muslim **2.** Hindu **3.** Christian **4.** Buddhist **5.** Ethnic
6. Other, *Specify*: ……..

CITIZENSHIP COLUMN 9

- **What is/are your nationality/nationalities by birth? Note the nationality or nationalities** at *year 0 in the column 9: Bangladeshi, Indian, etc.…*
- **And later on, did you change your nationality or acquire a new nationality/citizenship?** **1.** Yes
  2. No ➔ ***Family History: Q4***

  When did you change your nationality/citizenship?

  And which nationality/nationalities do you have at the moment?

  GRID: Note new nationality at every change that occurred. If multiple nationality, note both/all the nationalities that the interviewee has
- *Note: citizenship defined as passport(s) held / legal document(s) held*

FAMILY HISTORY: PARENTS, BROTHERS AND SISTERS

Now let's talk about your family…

Q4 - How many brothers have you had in total? |__|__|
Take into account ALL brothers, even if they are not from the same fathers or mothers and even if they are deceased.

Q5 - And how many sisters have you had in total? |__|__|
Take into account ALL sisters, even if they are not from the same fathers or mothers and even if they are deceased.

Q6 - Are you the first-born of the family? **1.** Yes **2.** No

Q7 - Did your father work when you were 15 years old? **1.** Yes **2.** No **9.** DK **0.** Father unknown or deceased at that age ***if 2, 9,0 ➔ Q10***

Q8 - Would you say he was:

Wage-earner: **1.** Higher-level occupation **2.** Skilled employee or worker **3.** Unskilled employee, worker, labourer

Non-wage employment: **4.** Employer **5.** Self-employed (without employees) **6.** Apprentice/trainee, intern **7.** Family help **9.** DK

Q9 - What was your father's level of education?

1. No schooling **2.** Junior school certificate **3.** Secondary School certificate **4.** Higher Secondary certificate **5.** Degree-level

Q10 - What was or were his nationalities?

1. …… **2.** …… **3.** ……

Q11 - Is he still alive? **1.** Yes **2.** No ➔ **Q11A – In which year did he die? |__|__|__|__|**

Q12 - And what was your mother's level of education?

1. No schooling **2.** Junior school certificate **3.** Secondary School certificate **4.** Higher Secondary certificate **5.** Degree-level

Q13 - What was or were her nationalities?

1. …… **2.** …… **3.** ……

Q14 - Is she still alive? **1.** Yes **2.** No ➔ **Q14A – In which year did she die? |__|__|__|__|**

We will now recollect the main events of your family life: the relationships, the children that you have had. Certain situations may not fit your personal life history, but this study has to be applicable to everybody, and we must therefore foresee all possible situations.

To begin let's talk about the PARTNERS that you have had in your life, whether you were married to them or not. Please indicate also those partners from whom you have separated or who are deceased.

- *1st relationship:* **When did your first relationship start?**

  To make it easier to remember, could you give me the first name of this person?

  GRID: Note: P (partner), the number of the partner and the first name of the partner - "P 1 Fatima" - in the grid at the start year of the relationship.

  Is this relationship still continuing today?

  If not: **When and how did it come to an end?**
  Note: S (separation), D (divorce) or DT (death) + no. of the partner + first name of the partner at the end year of the relationship: "D 1 Fatima"

  Did you have any CHILDREN with this partner? Please indicate also the children who are deceased.

  If yes: **In what year was the 1st child that you had with this partner born? (How old is the first child that you had with this partner now?)**

  What is his/her first name?

  GRID: Note in the grid: B (birth), the number of the child, the number of the relationship in which it was born and the first name of the child: "B1 P1 Sajida" at the year of birth.

  And the 2nd child that you had with this partner, when was he/she born?
  Note the birth of the 2nd child in this relationship at the year of birth in the grid, "B2 P1 Rasheed".

  And the 3rd child… *PROCEED in this way for all children born in this relationship.*

- **Have you had another relationship?...** *REPEAT the questions for each relationship: beginning and (possibly) end of every relationship + births and deaths of children.*

- *At the end: RECAPITULATE*: **Have you had any other children** *(outside of a relationship)* **?** **1.** Yes **2.** No

  GRID: Note these possible births outside of relationship in the grid: "B_OR Nazneen"

  Are all your children still alive? **1.** Yes **2.** No

  GRID: Note the death(s): DT (death) + the number of the child + the number of the relationship in which it was born + first name of the deceased child at the year of death: e.g.: "DT2 P1 Abdul".

IF EGO HAS NEVER HAD ANY PARTNER OR CHILD, MARK OFF: ☐ *NO PARTNER (Q15)* ☐ *NO CHILD (Q16)*

MIGRATION OF FAMILY MEMBERS AND PERSONAL NETWORK COLUMN 4

Now I would like to talk with you about the places where your family members or other close relatives and friends have lived…

Since you were born:

Q15F - Has your **father** already lived for at least a year outside this District? **1.** Yes **2.** No *If yes: note 01* |___|___|

Q15M - And has your **mother** already lived for at least a year outside this District? **1.** Yes **2.** No *If yes: note 01* |___|___|

Q15B - And one or several of your **brothers**, have they already lived for at least a year outside this District? **0.** No brother **1.** Yes **2.** No *If yes:* **Q15nB – How many?** |___|___|

Q15S - And one or several of your **sisters**? **0.** No sister **1.** Yes **2.** No *If yes:* **Q15nS – How many?** |___|___|

Q15P - And one of your **partners or previous partners**? **0.** No partner **1.** Yes **2.** No *If yes:* **Q15nP – How many?** |___|___|

Q15C - And one or several of your **children**? **0.** No child **1.** Yes **2.** No *If yes:* **Q15nC – How many?** |___|___|

Q15O - And **other relatives or close friends** you could count on, or could have counted on you to take in and to help you migrate to another place? **1.** Yes **2.** No *If yes:* **Q15nO – How many?** |___|___|

Q15T – Total : |___|___|

FILTER: ***- IF Q15T = 0*** *(No member of the family or personal network lived outside District for at least one year)* ➔ ***Go to RELATIONSHIPS MODULE Page 10***

- Otherwise ➔ ***Describe the trajectory of each person. NEXT PAGE***

TRAJECTORIES OF THE MIGRANTS AMONG FAMILY MEMBERS AND CLOSE FRIENDS AND RELATIVES

- *1st person: <u>GRID,</u> Note at the bottom of column 4:*
    - the **sex** of the person
    - the **first name** of the person (optional)
    - the **relationship** between this person and the respondent

      - Identify clearly the type of relationship:

      For the partners and children, record the identifier from the family-related columns 2.1 and 2.2 (e.g. P1, B4, etc.)

      For other persons indicate clearly: uncle, cousin, school friend…
    - *If the person is a friend or a partner:* **Since when do you know this person?** *Note the year at the bottom of the column..*

1st District: **Where was he or she living when you first met them?**

When did he or she start living there?

And until when did he/she live there? *Draw an arrow to indicate the period of time spent in the District.*

2nd District: **And then, in which District did he/she live for at least one year?** *Note the 2nd District at the year when the person started living there.*

Until when did he/she stay there? *Draw an arrow to indicate the period of time spent in this place.*

CONTINUE until the current place of residence and draw a line until <u>today</u>.

- *PROCEED in the same way with the second person...*

***ATTENTION**: - Start the trajectories as early as possible… at least from the moment when Ego first met the person whose trajectory he/she is describing.*

- If the person is deceased: Note DT at the corresponding year.

MODULE: RELATIONSHIPS

I WOULD NOW LIKE TO ASK YOU SOME MORE QUESTIONS ABOUT YOUR RELATIONSHIPS.
100 – Count in GRID (column 2.1) the number of relationships. You have had |__|__| relationships.

Questions	P 01	P 02	P 03	P 04	P 05
101 - No. of the partner/spouse *see GRID*	|__|__|	|__|__|	|__|__|	|__|__|	|__|__|
102S – 102E Start and end years of the relationship *See GRID – If ongoing cross out the end year*	|__|__| |__|__| Start End	|__|__| |__|__| Start End	|__|__| |__|__| Start End	|__|__| |__|__| Start End	|__|__| |__|__| Start End
If the relationship ended **103 – Type of dissolution** *(see GRID)* **1.** Separation or divorce **2.** Partner deceased	|__|	|__|	|__|	|__|	|__|
First name of the partner/spouse *Information not retained in data entry*	.....	.....	.....	.....	.....
104 – What was his/her level of education at that time? **1.** No schooling **2.** Completed Junior school **3.** Completed Secondary school **4.** Completed Higher Secondary **5.** Completed Degree-level	|__|	|__|	|__|	|__|	|__|
105 – At the beginning of your relationship, was your partner/spouse: **1.** Active, he/she was working **2.** Looking after the home or family; economically inactive ➔ ***FILTER*** **3.** Unemployed, searching for a job ➔ ***FILTER*** **4.** Pupil, student, apprentice ➔ ***FILTER*** **5.** Other inactive (ill, retired) ➔ ***FILTER***	|__|	|__|	|__|	|__|	|__|
106 – Was he/she: **1.** Higher-level occupation **2.** Skilled employee or worker **3.** Unskilled employee, worker, labourer **4.** Employer/ self-employed **5.** Helping family member	|__|	|__|	|__|	|__|	|__|
FILTER: Go to next relationship					

- ***MORE RELATIONSHIPS*** ➔ ***Additional sheets;*** *Otherwise,* ***CHILDREN MODULE*** ➔ ***Next page***

MODULE: CHILDREN

200 – COUNT THE NUMBER OF CHILDREN IN GRID (COLUMN 2.2):
|___|___| *CHILDREN. DO NOT REPEAT THE QUESTION ABOUT THE NUMBER OF CHILDREN TO THE RESPONDENT*
NOW I WOULD LIKE TO ASK A FEW QUESTIONS ABOUT YOUR CHILDREN. SO YOUR FIRST CHILD IS...

Questions	C 01	C 02	C 03	C 04	C 05
201B – 201D – Year of birth and possibly year of death *See GRID* *If child is alive, cross out year of death*	|___|___| |___|___| Birth Death	|___|___| |___|___| Birth Death	|___|___| |___|___| Birth Death	|___|___| |___|___| Birth Death	|___|___| |___|___| Birth Death
202 – No. of child *see GRID*	|___|___|	|___|___|	|___|___|	|___|___|	|___|___|
203 – Number of the relationship in which the child was born *see GRID – If birth occurred outside union; note 00*	|___|___|	|___|___|	|___|___|	|___|___|	|___|___|
First name of child *Information not retained in data entry*	.....	.....	.....	.....	.....
204 – Is this child a girl or a boy? **1.** Male **2.** Female	|___|	|___|	|___|	|___|	|___|
205 – In which district was he/she born? *Note answer in plain text*	.....	.....	.....	.....	.....
206 – What is/are his/her nationalities: ***Write down in plain text ALL nationalities held***	....	....	....	....	....
207 – Has this child always lived with you? **1.** Yes ➔**Go to next child** **2.** No	|___|	|___|	|___|	|___|	|___|
208 – How old was the child when they left home for the first time?	|___|___| years old	|___|___| years old	|___|___| years old	|___|___| years old	|___|___| years old
209- Why did they leave? **1.** Looked after by someone else **2.** Studies **3.** Looking for work **4.** Apprenticeship / started work **5.** Marriage **6.** Other	|___|	|___|	|___|	|___|	|___|

210 – Where did they go? *Note name of district in plain text*	……	……	……	……	……

- *FURTHER CHILDREN* ➔ *Next page* *Otherwise,* ***HOUSING HISTORY*** ➔ *Page* ***13***

Questions	C 06	C 07	C 08	C 09	C 10
201B – 201D – Year of birth and possibly year of death *See GRID* *If child is alive, cross out year of death*	|___|___| |___|___| Birth Death	|___|___| |___|___| Birth Death	|___|___| |___|___| Birth Death	|___|___| |___|___| Birth Death	|___|___| |___|___| Birth Death
202 – No. of child *see GRID*	|___|___|	|___|___|	|___|___|	|___|___|	|___|___|
203 – Number of the relationship in which the child was born *see GRID – If birth occurred outside union; note 00*	|___|___|	|___|___|	|___|___|	|___|___|	|___|___|
First name of child *Information not retained in data entry*	.....	.....	.....	.....	.....
204 – Is this child a girl or a boy? **1.** Male **2.** Female	|___|	|___|	|___|	|___|	|___|
205 – In which district was he/she born? *Note answer in plain text*	.....	.....	.....	.....	.....
206 – What is/are his/her nationalities: ***Write down in plain text ALL nationalities held***	....	....	....	....	....
207 – Has this child always lived with you? **1.** Yes ➔**Go to next child** **2.** No	|___|	|___|	|___|	|___|	|___|
208 – How old was the child when they left home for the first time?	|___|___| years old	|___|___| years old	|___|___| years old	|___|___| years old	|___|___| years old
209- Why did they leave? **1.** Looked after by someone else **2.** Studies **3.** Looking for work **4.** Apprenticeship / started work **5.** Marriage **6.** Other	|___|	|___|	|___|	|___|	|___|
210 – Where did they go? *Note name of district in plain text*	.....	.....	.....	.....	.....

- *FURTHER CHILDREN* ➔ *Additional sheet* *Otherwise,* ***HOUSING HISTORY*** ➔*Next page*

MODULE: HOUSING HISTORY

LET'S COME BACK TO THE HOUSES WHERE YOU HAVE LIVED.

300 – *Count in GRID (column 3.1)*: **YOU HAVE LIVED IN** |___|___| **HOUSES.**
INTERVIEWER: In this module you have to Fill in one column for each of the houses occupied by the respondent. Special case: If the respondent commutes between two different places of residence during a certain period of time: Fill in a column to describe each of the houses, place a curly bracket over the 2 columns and note the frequency of changeover (e.g. 9 months in dhaka; 3 months in khulna, or weekdays in boarding school; weekends at my Uncle's PLACE). …

Questions	D 01	D 02	D 03	D 04	D 05
301D – 301F – Years of arrival in and departure *see GRID* *If ongoing cross out the end year*	|___|___| Start |___|___| End	|___|___| Start |___|___| End	|___|___| Start |___|___| End	|___|___| Start |___|___| End	|___|___| Start |___|___| End
302 – Name of the DISTRICT *see GRID*	……	……	……	……	……
303 – You lived then in "name of the TOWN or VILLAGE" *see GRID – in CAPITAL letters*	……	……	……	……	……
304 – When you arrived in this house, were you: **1.** Living rent free **2.** Tenant (paying rent) **3.** Owner or leaseholder **4.** Resident in a hostel, student residence **5.** Other	|___|	|___|	|___|	|___|	|___|
305 – What type of housing was it? **1.** A room **2.** An apartment **3.** A traditional house **4.** A modern house (e.g. brick) **5.** Other, *Specify*	|___| ……	|___| ……	|___| ……	|___| ……	|___| ……

Questions	D 01	D 02	D 03	D 04	D 05
306 – <u>When you lived in this house</u> would you say that the financial situation of the household regarding the purchase of staple goods was… **1.** Always sufficient? **2.** Just sufficient? **3.** Often insufficient?	|___|	|___|	|___|	|___|	|___|
307 – And relative to other people from your village/town, would you say that your living conditions were: **1.** Better? **2.** Equivalent? **3.** Less good?	|___|	|___|	|___|	|___|	|___|
308 – <u>When you lived in this house</u>, did you experience any of the following: *Read* **:** **1.** Flooding **2.** Cyclone **3.** River-bank/coastal erosion **4.** Drinking water shortage/pollution **5.** Salinization **6.** Reduced crop yields **7.** Reduced fish catch **8.** Drought/lack of rain **9.** Erratic rainfall **FILTER: No: Leave blank and go to next residence period**	|___| |___| |___| |___| |___| |___| |___| |___| |___|	|___| |___| |___| |___| |___| |___| |___| |___| |___|	|___| |___| |___| |___| |___| |___| |___| |___| |___|	|___| |___| |___| |___| |___| |___| |___| |___| |___|	|___| |___| |___| |___| |___| |___| |___| |___| |___|
309 – Did this influence your migration decision? **1.** Yes **2.** Partially **3.** No	|___|	|___|	|___|	|___|	|___|

Questions	D 01	D 02	D 03	D 04	D 05
310 – <u>While you lived in this house</u> would you say that any of the following became more of a concern… *Read* **:** **1.** Flooding **2.** Cyclone **3.** River-bank/coastal erosion **4.** Drinking water shortage/pollution **5.** Salinization **6.** Reduced crop yields **7.** Reduced fish catch **8.** Drought/lack of rain **9.** Erratic rainfall **FILTER: No: Leave blank and go to next residence period**	|___| |___| |___| |___| |___| |___| |___| |___|	|___| |___| |___| |___| |___| |___| |___| |___|	|___| |___| |___| |___| |___| |___| |___| |___|	|___| |___| |___| |___| |___| |___| |___| |___|	|___| |___| |___| |___| |___| |___| |___| |___|
311 – Did this influence your migration decision? **1.** Yes **2.** Partially **3.** No	|___|	|___|	|___|	|___|	|___|

- ***MORE HOUSES*** ➔ *Next page*
- *Otherwise*

312 **Of all of these places you have lived, which do you most consider your home?** |___|___|

313 **Is this where your father or mother lived?** **1.** Yes **2.** No |___|

313 **Do you consider it safe to live in this place?** **1.** Yes **2.** No |___|

314 **Do you want your children to live / grow up in this place?** **1.** Yes **2.** No |___|

- *Now go to* ***ACTIVITY AND EDUCATION HISTORY*** ➔ *Page* ***19***

Questions	D 06	D 07	D 08	D 09	D10
301D – 301F – Years of arrival in and departure *see GRID* *If ongoing cross out the end year*	|___|___| Start |___|___| End	|___|___| Start |___|___| End	|___|___| Start |___|___| End	|___|___| Start |___|___| End	|___|___| Start |___|___| End
302 – Name of the DISTRICT *see GRID*	……	……	……	……	……
303 – You lived then in "name of the TOWN or VILLAGE" *see GRID – in CAPITAL letters*	……	……	……	……	……
304 – When you arrived in this house, were you: **1.** Living rent free **2.** Tenant (paying rent) **3.** Owner or leaseholder **4.** Resident in a hostel, student residence **5.** Other	|___|	|___|	|___|	|___|	|___|
305 – What type of housing was it? **1.** A room **2.** An apartment **3.** A traditional house **4.** A modern house (e.g. brick) **5.** Other, *Specify*	|___| ……	|___| ……	|___| ……	|___| ……	|___| ……

Questions	D 06	D 07	D 08	D 09	D10
306 – <u>When you lived in this house</u> would you say that the financial situation of the household regarding the purchase of staple goods was… **1.** Always sufficient? **2.** Just sufficient? **3.** Often insufficient?	|___|	|___|	|___|	|___|	|___|
307 – And relative to other people from your village/town, would you say that your living conditions were: **1.** Better? **2.** Equivalent? **3.** Less good?	|___|	|___|	|___|	|___|	|___|
308 – <u>When you lived in this house</u>, did you experience any of the following: **1.** Flooding **2.** Cyclone **3.** River-bank/coastal erosion **4.** Drinking water shortage/pollution **5.** Salinization **6.** Reduced crop yields **7.** Reduced fish catch **8.** Drought/lack of rain **9.** Erratic rainfall **FILTER: No: Leave blank and go to next residence period**	|___| |___| |___| |___| |___| |___| |___| |___| |___|	|___| |___| |___| |___| |___| |___| |___| |___| |___|	|___| |___| |___| |___| |___| |___| |___| |___| |___|	|___| |___| |___| |___| |___| |___| |___| |___| |___|	|___| |___| |___| |___| |___| |___| |___| |___| |___|
309 – Did this influence your migration decision? **1.** Yes **2.** Partially **3.** No	|___|	|___|	|___|	|___|	|___|

Questions	D 06	D 07	D 08	D 09	D10
310 – <u>While you lived in this house</u> would you say that any of the following became more of a concern… **1.** Flooding **2.** Cyclone **3.** River-bank/coastal erosion **4.** Drinking water shortage/pollution **5.** Salinization **6.** Reduced crop yields **7.** Reduced fish catch **8.** Drought/lack of rain **9.** Erratic rainfall **FILTER: No: Leave blank and go to next residence period**	|___| |___| |___| |___| |___| |___| |___| |___|	|___| |___| |___| |___| |___| |___| |___| |___|	|___| |___| |___| |___| |___| |___| |___| |___|	|___| |___| |___| |___| |___| |___| |___| |___|	|___| |___| |___| |___| |___| |___| |___| |___|
311 – Did this influence your migration decision? **1.** Yes **2.** Partially **3.** No	|___|	|___|	|___|	|___|	|___|

- ***MORE HOUSES*** ➔ *Additional sheets*

- *Otherwise*

312 **Of all of these places you have lived, which do you most consider your home?** |___|___|

313 **Is this where your father or mother lived?** **1.** Yes **2.** No |___|

313 **Do you consider it safe to live in this place?** **1.** Yes **2.** No |___|

314 **Do you want your children to live / grow up in this place?** **1.** Yes **2.** No |___|

- *Now go to **ACTIVITY AND EDUCATION HISTORY** ➔ Next Page*

ACTIVITY AND EDUCATION HISTORY COLUMN 5

We will now talk about what you have been doing since your childhood: I would like to ask you about your periods of STUDY, of PROFESSIONAL TRAINING, of WORK, at HOME or if you were UNEMPLOYED, etc.

Note in the grid the primary activities lasting at least for 1 year (or equivalent duration to one academic year). Indicate, if there is enough space; the shorter activity periods in the column titled "Comments and Specifications" e.g. 5 months unemployed after dismissal.

- *1st activity / inactivity:* **What did you do at the age of 6? What was your primary activity?**
  GRID: Note the primary activity at 6 years: "school", "helped parents in the field"; "at home", etc…

  Until when did you continue (*adjust*) **going to school / staying at home / helping your parents…?**
  GRID: Locate the year where the first change in the occupation occurs and draw an arrow to the 2nd occupation.

- *2nd activity / inactivity:* **And then; what did you do? And until when?**
  GRID: Note the new activity or inactivity at the line of the year when it begins and draw an arrow to the 3rd occupation.

- *Continue in the same way for each activity or inactivity period, up to the respondent's current situation.*

ATTENTION: *Always start a new activity period when Ego changes District, even if his or her activity remains the same.*

Study periods

- *Do not differentiate between different levels of schooling.*
- *… but consider University as a specific period*
- *Indicate possible interruptions in the education periods.*

Occupation periods: Consider as a change in the time period every change in activity consisting in:

- *A change in occupation, profession, status*
- *A change of employer*

Q16 – What is the highest level of qualification that you have obtained?

1. No schooling **2.** Junior school certificate **3.** Secondary school certificate **4.** Higher Secondary certificate **5.** Degree

MODULE – PERIODS OF ACTIVITY AND INACTIVITY

LET'S TALK IN SOME DETAIL ABOUT THE DIFFERENT EDUCATIONAL AND OCCUPATIONAL STATUSES YOU HAVE HAD IN YOUR LIFE…

400 – *Count (column 5) the different periods in GRID:*|___|___| *WITHOUT FORGETTING THE SCHOOLING AND ECONOMICALLY INACTIVE PERIODS*.

Questions	**A 01**	**A 02**	**A 03**	**A 04**	**A 05**
401S – 401E - Start and end years *see GRID* *If ongoing cross out the end year*	|___|___| |___|___| Start End	|___|___| |___|___| Start End	|___|___| |___|___| Start End	|___|___| |___|___| Start End	|___|___| |___|___| Start End
402 – During this period, you were <u>primarily</u>: **1.** Active, you were working **2.** Looking after the home or family; economically inactive ➔ ***406*** **3.** Unemployed, searching for a job ➔ ***406*** **4.** Pupil, student, apprentice ➔ ***406*** **5.** Other inactive (ill, retired) ➔ ***406***	|___| …… ……	|___| …… ……	|___| …… ……	|___| …… ……	|___| …… ……
403 – What was you exact occupation during this period? What were your tasks? *Describe very precisely: occupation, level of qualification, sector*	…… …… …… |___|___|___|	…… …… …… |___|___|___|	…… …… …… |___|___|___|	…… …… …… |___|___|___|	…… …… …… |___|___|___|
404 – Were you… **1.** Higher-level occupation **2.** Skilled employee or worker **3.** Unskilled employee, worker, labourer **4.** Employer/ self-employed **5.** Helping family member business or farm	|___|	|___|	|___|	|___|	|___|

Questions	A 01	A 02	A 03	A 04	A 05
405 – All-in-all would you say that during this period you had enough to live on from day-to-day? **1.** Yes, absolutely **2.** It depended **3.** No, not at all	|___|	|___|	|___|	|___|	|___|
406 – At one moment or another during this period, did you receive …*Read:* **1.** A wage, income from your main activity? **2.** Income from moonlighting, small jobs, occasional employment? **3.** An unemployment benefit? **4.** A retirement pension, disability pension, other type of pension? **5.** Social benefits (family allowances, welfare benefits) **6.** A scholarship? **7.** Income from rents, interest or other capital income? **8.** Other resources? ***If no resource ➔ Check off and go to the next period***	|___| |___| |___| |___| |___| |___| |___| |___| No resource ❑	|___| |___| |___| |___| |___| |___| |___| |___| No resource ❑	|___| |___| |___| |___| |___| |___| |___| |___| No resource ❑	|___| |___| |___| |___| |___| |___| |___| |___| No resource ❑	|___| |___| |___| |___| |___| |___| |___| |___| No resource ❑
407 – What is the main reason you changed economic activity? *Write as clearly as possible the reason given*	.... |___|___|___|	.... |___|___|___|	.... |___|___|___|	.... |___|___|___|	.... |___|___|___|

- *More periods of ACTIVITY or INACTIVITY ➔ Next page*
- Otherwise, go to HISTORY OF ASSETS AND BUSINESSES ➔ *Page **24***

Questions	A 06	A 07	A 08	A 09	A 10
401S – 401E - Start and end years *see GRID* *If ongoing cross out the end year*	|___|___| |___|___| Start End	|___|___| |___|___| Start End	|___|___| |___|___| Start End	|___|___| |___|___| Start End	|___|___| |___|___| Start End
402 – During this period, you were <u>primarily</u>: **1.** Active, you were working **2.** Looking after the home or family; economically inactive ➔ ***406*** **3.** Unemployed, searching for a job ➔ ***406*** **4.** Pupil, student, apprentice ➔ ***406*** **5.** Other inactive (ill, retired) ➔ ***406***	|___|	|___|	|___|	|___|	|___|
403 – What was you exact occupation during this period? What were your tasks? *Describe very precisely: occupation, level of qualification, sector*	…… …… …… |___|___|___|	…… …… …… |___|___|___|	…… …… …… |___|___|___|	…… …… …… |___|___|___|	…… …… …… |___|___|___|
404 – Were you… **1.** Higher-level occupation **2.** Skilled employee or worker **3.** Unskilled employee, worker, labourer **4.** Employer/ self-employed **5.** Helping family member business or farm	|___|	|___|	|___|	|___|	|___|

Questions	A 06	A 07	A 08	A 09	A 10
405 – All-in-all would you say that during this period you had enough to live on from day-to-day? **1.** Yes, absolutely **2.** It depended **3.** No, not at all	|___|	|___|	|___|	|___|	|___|
406 – At one moment or another during this period, did you receive …*Read:* **1.** A wage, income from your main activity? **2.** Income from moonlighting, small jobs, occasional employment? **3.** An unemployment benefit? **4.** A retirement pension, disability pension, other type of pension? **5.** Social benefits (family allowances, welfare benefits) **6.** A scholarship? **7.** Income from rents, interest or other capital income? **8.** Other resources? ***If no resource ➔ Check off and go to the next period***	|___| |___| |___| |___| |___| |___| |___| |___| No resource ❑	|___| |___| |___| |___| |___| |___| |___| |___| No resource ❑	|___| |___| |___| |___| |___| |___| |___| |___| No resource ❑	|___| |___| |___| |___| |___| |___| |___| |___| No resource ❑	|___| |___| |___| |___| |___| |___| |___| |___| No resource ❑
407 – What is the main reason you changed economic activity? *Write as clearly as possible the reason given*	…… …… …… |___|___|___|	…… …… …… |___|___|___|	…… …… …… |___|___|___|	…… …… …… |___|___|___|	…… …… …… |___|___|___|

- *More periods of ACTIVITY or INACTIVITY ➔ Additional sheets*
- Otherwise, go to HISTORY OF ASSETS AND BUSINESSES ➔ *Next page*

MODULE: HISTORY OF ASSETS AND BUSINESSES OWNED

Now we will talk about the assets or businesses that you may have bought over your lifetime, or that you may have received or inherited from somebody.

1. Are you <u>CURRENTLY</u> owner…			**2. And <u>in the past</u>, have you been owner, here or elsewhere …**			**Total**
…of one or several plots of land (agricultural land, building plot, or under construction)	**1.** Yes ➔ How many? **2.** No ➔ *Note 00*	Q17PC |___|___|	…of plots that you don't own anymore?	**1.** Yes ➔ How many? **2.** No ➔ *Note 00*	Q17PP |___|___|	
…of one or several housing units (house, apartment…)?	**1.** Yes ➔ How many? **2.** No ➔ *Note 00*	Q17DC |___|___|	…of housing units that you don't own anymore?	**1.** Yes ➔ How many? **2.** No ➔ *Note 00*	Q17DP |___|___|	
…of a business, venture, commercial premises even on a rental basis (shop, workshop, taxis, rickshaw, boat…)?	**1.** Yes ➔ How many? **2.** No ➔ *Note 00*	Q17BC |___|___|	…of a business, a venture, commercial premises even on a rental basis that you don't own anymore?	**1.** Yes ➔ How many? **2.** No ➔ *Note 00*	Q17BP |___|___|	
Total		Q17TC |___|___|			Q17TP |___|___|	Q17TOT |___|___|

FILTR: ***If NO ASSET (Q17TOT = 0) ➔ Go to TRANSFERS, Page 27***

Otherwise ➔ Fill out one column per owned asset

Follow the order of the table: plots of land, then housing units, then businesses currently owned before continuing with the assets owned in the past.

Questions	**AS01**	**AS 02**	**AS 03**	**AS 04**	**AS 05**
LET'S FIRST TALK ABOUT YOUR...*Encircle the type of asset*	Plot – House – Business	Plot – House – Business	Plot – House – Business	Plot – House – Business	Plot – House – Business
501 – How did you obtain this asset? **1.** You bought it? **2.** You inherited it? **3.** You were given it? **4.** You reclaimed it? **5.** For another reason? *Specify*	|___| ……	|___| ……	|___| ……	|___| ……	|___| ……
501S – When (in which year) did you obtain it?	|___|___| Start	|___|___| Start	|___|___| Start	|___|___| Start	|___|___| Start
FILTER: If Ego is no longer owner of the asset ➔ 501E ***Otherwise ➔ 503***					
501E - And until when did you own this asset?	|___|___| End	|___|___| End	|___|___| End	|___|___| End	|___|___| End
502 – You don't own this asset anymore because… **1.** You sold it? **2.** You have donated / bequeathed it? **3.** You went bankrupt? **4.** For another reason? *Specify*	|___| ……	|___| ……	|___| ……	|___| ……	|___| ……
503 – Is the asset we are talking about: ***Plot of land*** **1.** A building plot, or with a building currently under construction ➔ ***508*** **2.** A plot for agricultural use ➔ ***504*** ***Housing unit*** **3.** A traditional house ➔ ***505*** **4.** A modern house or apartment ➔ ***505*** **5.** An apartment block ➔ ***505*** ***Businesses and ventures*** **6.** A business, commercial premises (shop, workshop…) ➔ ***505*** **7.** A business, venture without walls (patent, goodwill & tools & ➔ ***505***	|___|___|	|___|___|	|___|___|	|___|___|	|___|___|

merchandise, taxis, rickshaws, boats…)					

Questions	AS 01	AS 02	AS 03	AS 04	AS 05
504 – Most of the time, this plot has been used… **1.** As grazing land/pasture ➔ ***509*** **2.** As an orchard ➔ ***509*** **3.** For market gardening ➔ ***509*** **4.** For irrigated crop-growing ➔ ***509*** **5.** For other types of crop ➔ ***509*** **6.** For aquaculture ➔ ***509*** **7.** Has been unused ➔ ***510***	|___|	|___|	|___|	|___|	|___|
505 – Most of the time, this asset has been: **1.** Rented out (dwelling, commercial premises)? ➔ ***510*** **2.** Operated (business,…)? ➔ ***506*** **3.** Used free of charge for personal use? ➔ ***509*** **4.** Unoccupied, unused? ➔ ***510***	|___|	|___|	|___|	|___|	|___|
506 – What is/was the activity performed? ***Note response in plain text***	…… ……	…… ……	…… ……	…… ……	…… ……
507 – This asset has been operated or used… *Read out* **1.** By yourself? **2.** By family members? **3.** By other persons?	|___| |___| |___|	|___| |___| |___|	|___| |___| |___|	|___| |___| |___|	|___| |___| |___|
508 – In which District is this asset located? *Note answer in plain text*	……	……	……	……	……

- ***MORE ASSETS*** ➔ *Additional sheets*
- *Otherwise, Go to TRANSFERS* ➔ *Next page*

TRANSFERS COLUMNS 6 AND 7

Q18 - Have there been periods at any time of your life during which you used to regularly send money to somebody who was living in a different place (e.g. District, or abroad) from the one where you were at the time?

1. Yes ➔ **from which year(s) to which year(s)?**

➔ **And in what District did the persons to whom you sent money live?**

GRID: Note "TRO + Name of the District" at the start year in column 6 and draw an arrow to the end of this period.

➔ **Have there been further periods when you used to send money regularly?**

2. No

Q19 – Have there been any periods at any time of your life during which you use to regularly receive money from somebody who was living in a different place (i.e. District, or abroad) from the one your were living in at the time?

1. Yes ➔ **from which year(s) to which year(s)?**

➔ **And in what District did the persons from whom you received money live?**

GRID: Note "TRI + Name of the District" at the start year in column 7 and draw an arrow to the end of this period.

➔ **Have there been further periods when you used to receive money regularly?**

2. No

STAYS OF LESS THAN A YEAR OUTSIDE YOUR TOWN/VILLAGE COLUMN 8

Q20 – Have there been periods where you have stayed for periods of less than a year, but more than a month outside the District you were/are living in?

1. Yes

2. No ➔ ***- If Ego has already lived outside District (column 3.2) ➔ Module LONG AND SHORT STAYS OUTSIDE DISTRICT, page 29***

- If ego has never lived outside District ➔ END of the interview; Note the time on page 33

In which Districts have you stayed? *List the Districts*

1. …….....	**5.** …….....	**9.** …….....	**13.** …….....
2. …….....	**6.** …….....	**10.** …….....	**14.** …….....
3. …….....	**7.** …….....	**11.** …….....	**15.** …….....
4. …….....	**8.** …….....	**12.** …….....	**16.** …….....

- *1st District:* **In which year did you go there for the first time?**

  GRID: Note the name of the District in the appropriate year

  Did you visit this country again later on, staying again for more than a month, but less than a year?

  If yes: **In which year(s)?**
  In GRID: Note ALL stays of more than a month but less than a year in this District in the appropriate year(s)

- *2nd District: CONTINUE IN THIS WAY for each District.*

ATTENTION**: - **If during a period of several years the respondent visits a District or several Districts for the same reason every year: GROUP these stay. Note the District or Districts at the beginning of the time period and draw an arrow to the end of the period.

- DON'T FORGET to explore other possible stays outside this time period.

MODULE: LONG AND SHORT STAYS OUTSIDE DISTRICT OF BIRTH

(= SHORT STAYS + STAYS OF MORE THAN 1 YEAR)

LET'S LOOK IN SOME MORE DETAIL AT THE HISTORY OF YOUR STAYS OUTSIDE YOUR DISTRICT OF BIRTH

600S – Count (column 8) every short stay *(recount a District if it is cited several times in GRID but the trips are not grouped):* **|___|___|**

600L – Count (column 3.2) every <u>STAY OF MORE THAN 1 YEAR</u> *(count a District several times if Ego went there repeatedly)*: **|___|___|**

600TOT - TOTAL : |___|___|

Fill in one column per stay, category by category (SHORT, then LONG), following a chronological order within each category.

Questions	S01	S02	S03	S04	S05
601S – 601E – Start and end years of the stay - see *GRID* *If stay is ongoing, cross out end date*	|___|___| |___|___| Start End	|___|___| |___|___| Start End	|___|___| |___|___| Start End	|___|___| |___|___| Start End	|___|___| |___|___| Start End
602 – DISTRICT OF STAY/ARRIVAL **see** *GRID, columns 3.2 andt 8*	.....	.....	.....	.....	.....
603 – In which District were you just before arriving in "District of stay"? *Do not rely on GRID*	.....	.....	.....	.....	.....
604 – For what reasons did you leave this District? ***Note precisely and verbatim the entire response***	....	....	....	....	....

Questions	S01	S02	S03	S04	S05
605 – And for what reasons did you choose to go to "District of stay" <u>rather than to anywhere else?</u> ***Note precisely and verbatim the entire response***	…… …… …… …… …… ……	…… …… …… …… …… ……	…… …… …… …… …… ……	…… …… …… …… …… ……	…… …… …… …… …… ……
606 – Did you need a permit or other documentation to live or work in "District of stay"… **1.** A residence permit **2.** A permit to work **3.** You didn't need any permission ➔ **608**	|___| |___| …… ……	|___| |___| …… ……	|___| |___| …… ……	|___| |___| …… ……	|___| |___| …… ……
607 – **Did you have this permit or documentation?** **1.** Yes **2.** For some of the time **3.** No	|___| |___| |___| |___| |___| |___| ……	|___| |___| |___| |___| |___| |___| ……	|___| |___| |___| |___| |___| |___| ……	|___| |___| |___| |___| |___| |___| ……	|___| |___| |___| |___| |___| |___| ……
608 – Did you travel… **Read:** **1.** With your father or mother? **2.** With your partner(s)? **3.** With another family member? **4.** With one or several friends? **5.** With the whole community **6.** With somebody else? *Specify* **0.** Alone?	|___| |___| |___| |___| |___| |___| …… …… …… ……	|___| |___| |___| |___| |___| |___| …… …… …… ……	|___| |___| |___| |___| |___| |___| …… …… …… ……	|___| |___| |___| |___| |___| |___| …… …… …… ……	|___| |___| |___| |___| |___| |___| …… …… …… ……

Questions	S01	S02	S03	S04	S05
609 – Who decided about your trip/migration? *Read* ***:*** **0.** Yourself **1.** Your father or mother? **2.** Your partner? **3.** Your in-laws? **4.** Another family member? **5.** Your employer? **6.** The community? **7.** Somebody else? *Specify*	|___| |___| |___| |___| |___| |___| …… …… ……	|___| |___| |___| |___| |___| |___| …… …… ……	|___| |___| |___| |___| |___| |___| …… …… ……	|___| |___| |___| |___| |___| |___| …… …… ……	|___| |___| |___| |___| |___| |___| …… …… ……
610 – And who helped to finance your migration? *Read* **:** **0.** Yourself **1.** Your father or mother? **2.** Your partner? **3.** Your in-laws? **4.** Another family member? **5.** Your employer? **6.** The community **7.** Somebody else? *Specify*	|___| |___| |___| |___| |___| |___| …… …… ……	|___| |___| |___| |___| |___| |___| …… …… ……	|___| |___| |___| |___| |___| |___| …… …… ……	|___| |___| |___| |___| |___| |___| …… …… ……	|___| |___| |___| |___| |___| |___| …… …… ……
611 – In the year you moved, had any of the following happened in the place you were living (before you moved) **Read :** **1.** Flooding **2.** Cyclone **3.** River-bank/coastal erosion **4.** Drinking water shortage/pollution **5.** Salinization **6.** Reduced crop yields **7.** Reduced fish catch **8.** Drought/lack of rain **9.** Erratic rainfall	|___| |___| |___| |___| |___| |___| |___| |___| |___|	|___| |___| |___| |___| |___| |___| |___| |___| |___|	|___| |___| |___| |___| |___| |___| |___| |___| |___|	|___| |___| |___| |___| |___| |___| |___| |___| |___|	|___| |___| |___| |___| |___| |___| |___| |___| |___|

Questions	S01	S02	S03	S04	S05
612 – While you lived in "District of stay", did you make any monetary or in-kind donations to help the inhabitants of your home village, e.g. to build facilities? **1.** Yes **2.** No ➔ *Go to next stay*	|___|	|___|	|___|	|___|	|___|
613 – Did you contribute to building... **1.** A school? **2.** A health centre? **3.** A borehole (to supply water)? **4.** Flood defences? **5.** A drainage system? **6.** An irrigation system? **7.** A mosque or religious building? **8.** A cyclone shelter? **9.** Something else? *Specify*	|___| |___| |___| |___| |___| |___| |___| |___| ……	|___| |___| |___| |___| |___| |___| |___| |___| ……	|___| |___| |___| |___| |___| |___| |___| |___| ……	|___| |___| |___| |___| |___| |___| |___| |___| ……	|___| |___| |___| |___| |___| |___| |___| |___| ……

- ***MORE STAYS*** ➔ *Additional sheets*
- *Otherwise …*

We are now at the end of the interview. I thank you very much for your participation.

Would you like to make any comments or give us your opinion about this questionnaire or this study?

……

……

END TIME : |___|___| hr |___|___| min

INTERVIEWER'S OBSERVATIONS – TO BE FILLED OUT AFTER THE INTERVIEW

E1 – This person was :
1. Easily persuaded to participate ➔ **E2**
2. A bit difficult to persuade
3. Very difficult to persuade

E1A – For what reasons was he/she reluctant to participate? And which arguments enabled you to convince him/her in the end?

……..

E2 - The reception by the respondent was:
1. Very good over the entire interview
2. Good, but reluctant on certain questions ➔ **E2R – Which ones?** …….
3. Quite reluctant or suspicious over the entire duration of the interview
4. Other: *Specify*:……

E4 – And were any other person(s) present during the interview? **1.** yes
2. no ➔ **E5**

E4I – Did you have the impression that this presence influenced the respondent in his/her answers?
1. Yes, the entire questionnaire
2. Yes, certain parts of the questionnaire ➔ **E4Q – Which ones (specify the nb of the questions)?**
……..
3. No

E6 - According to you, was the respondent's general comprehension of the questions:
1. Very good
2. Adequate, but not perfect
3. Bad

E7 – And did the respondent have problems answering certain questions? **1.** Yes ➔ **E7D – Which ones? No.**:……
2. No

INFORMATION TO TRANSCRIBE AFTER THE INTERVIEW BASED ON THE BIOGRAPHICAL GRID

MODULE: MIGRATIONS AMONG FAMILY OR CONTACT CIRCLE MEMBERS

SEE GRID COLUMNS 4

900 – Count in GRID the number of family or contact circle members who have lived outside District of Ego's birth |___| ___| and fill in one column per person. (in principle, number equal to Q15TOT).

MIGRANTS IN THE FAMILY/NETWORK	M1	M2	M3	M4	M5
901 – Relationship: the person is Ego's *Code:* **1.** Partner + No. **2.** Son / daughter + No. **3.** Father / mother **4.** Brother / sister **5.** Other relative, *Specify* **6.** Friend **7.** Other, *Specify* *If the person is Ego's child or partner indicate his or number given in GRID.*	Relationship: |___|___| …… No. Partner (Q101): |___|___| No. Child (Q202): |___|___|	Relationship: |___|___| …… No. Partner (Q101): |___|___| No. Child (Q202): |___|___|	Relationship: |___|___| …… No. Partner (Q101): |___|___| No. Child (Q202): |___|___|	Relationship: |___|___| …… No. Partner (Q101): |___|___| No. Child (Q202): |___|___|	Relationship: |___|___| …… No. Partner (Q101): |___|___| No. Child (Q202): |___|___|
902 – **Sex: 1.** Male **2.** Female	|___|	|___|	|___|	|___|	|___|
903M – **Year in which they met** *Cross out if the person is not a partner or a friend*	|___|___|	|___|___|	|___|___|	|___|___|	|___|___|
903D – Year of death *Cross out if the person is not deceased*	|___|___|	|___|___|	|___|___|	|___|___|	|___|___|
904 – District 1 (1st District outside of place of birth). *In plain text and CAPITALS*	……	……	……	……	……
904S – 904E – Start and end year *Cross out if still there*	|___|___| |___|___| Start End	|___|___| |___|___| Start End	|___|___| |___|___| Start End	|___|___| |___|___| Start End	|___|___| |___|___| Start End
905 – District 2 (2nd District outside of place of birth). *In plain text and CAPITALS*	……	……	……	……	……
905S – 905E – Start and end year *Cross out if still there*	|___|___| |___|___| Start End	|___|___| |___|___| Start End	|___|___| |___|___| Start End	|___|___| |___|___| Start End	|___|___| |___|___| Start End
906 – District 3 (3rd District outside of place of birth) *In plain text and CAPITALS*	……	……	……	……	……
906S – 906E – Start and end year *Cross out if still there*	|___|___| |___|___| Start End	|___|___| |___|___| Start End	|___|___| |___|___| Start End	|___|___| |___|___| Start End	|___|___| |___|___| Start End
907 – District 4 (4th District outside of place of birth) *In plain text and CAPITALS*	……	……	……	……	……
907S – 907E – Start and end year *Cross out if still there*	|___|___| |___|___| Start End	|___|___| |___|___| Start End	|___|___| |___|___| Start End	|___|___| |___|___| Start End	|___|___| |___|___| Start End

- ***More migrants*** ➔ *next page*
- ***MODULE CITIZENSHIP*** ➔ *Page 38*

MIGRANTS IN THE FAMILY/NETWORK	**M6**	**M7**	**M8**	**M9**	**M10**
901 – Relationship: the person is Ego's *Code:* **1.** Partner + No. **2.** Son / daughter + No. **3.** Father / mother **4.** Brother / sister **5.** Other relative, *Specify* **6.** Friend **7.** Other, *Specify* *If the person is Ego's child or partner indicate his or number given in GRID.*	Relationship: |___|___| …… No. Partner (Q101): |___|___| No. Child (Q202): |___|___|	Relationship: |___|___| …… No. Partner (Q101): |___|___| No. Child (Q202): |___|___|	Relationship: |___|___| …… No. Partner (Q101): |___|___| No. Child (Q202): |___|___|	Relationship: |___|___| …… No. Partner (Q101): |___|___| No. Child (Q202): |___|___|	Relationship: |___|___| …… No. Partner (Q101): |___|___| No. Child (Q202): |___|___|
902 – **Sex: 1.** Male **2.** Female	|___|	|___|	|___|	|___|	|___|
903M – **Year in which they met** *Cross out if the person is not a partner or a friend*	|___|___|	|___|___|	|___|___|	|___|___|	|___|___|
903D – Year of death *Cross out if the person is not deceased*	|___|___|	|___|___|	|___|___|	|___|___|	|___|___|
904 – District 1 (1st District outside of place of birth). *In plain text and CAPITALS*	……	……	……	……	……
904S – 904E – Start and end year *Cross out if still there*	|___|___| |___|___| Start End	|___|___| |___|___| Start End	|___|___| |___|___| Start End	|___|___| |___|___| Start End	|___|___| |___|___| Start End
905 – District 2 (2nd District outside of place of birth). *In plain text and CAPITALS*	……	……	……	……	……
905S – 905E – Start and end year *Cross out if still there*	|___|___| |___|___| Start End	|___|___| |___|___| Start End	|___|___| |___|___| Start End	|___|___| |___|___| Start End	|___|___| |___|___| Start End
906 – District 3 (3rd District outside of place of birth) *In plain text and CAPITALS*	……	……	……	……	……
906S – 906E – Start and end year *Cross out if still there*	|___|___| |___|___| Start End	|___|___| |___|___| Start End	|___|___| |___|___| Start End	|___|___| |___|___| Start End	|___|___| |___|___| Start End
907 – District 4 (4th District outside of place of birth) *In plain text and CAPITALS*	……	……	……	……	……
907S – 907E – Start and end year *Cross out if still there*	|___|___| |___|___| Start End	|___|___| |___|___| Start End	|___|___| |___|___| Start End	|___|___| |___|___| Start End	|___|___| |___|___| Start End

- ***More migrants*** ➔ *next page*
- ***MODULE CITIZENSHIP*** ➔ *Page 38*

MIGRANTS IN THE FAMILY/NETWORK	M11	M12	M13	M14	M15
901 – Relationship: the person is Ego's *Code:* **1.** Partner + No. **2.** Son / daughter + No. **3.** Father / mother **4.** Brother / sister **5.** Other relative, *Specify* **6.** Friend **7.** Other, *Specify* *If the person is Ego's child or partner indicate his or number given in GRID.*	Relationship: |___|___| …… No. Partner (Q101): |___|___| No. Child (Q202): |___|___|	Relationship: |___|___| …… No. Partner (Q101): |___|___| No. Child (Q202): |___|___|	Relationship: |___|___| …… No. Partner (Q101): |___|___| No. Child (Q202): |___|___|	Relationship: |___|___| …… No. Partner (Q101): |___|___| No. Child (Q202): |___|___|	Relationship: |___|___| …… No. Partner (Q101): |___|___| No. Child (Q202): |___|___|
902 – **Sex: 1.** Male **2.** Female	|___|	|___|	|___|	|___|	|___|
903M – **Year in which they met** *Cross out if the person is not a partner or a friend*	|___|___|	|___|___|	|___|___|	|___|___|	|___|___|
903D – Year of death *Cross out if the person is not deceased*	|___|___|	|___|___|	|___|___|	|___|___|	|___|___|
904 – District 1 (1st District outside of place of birth). *In plain text and CAPITALS*	……	……	……	……	……
904S – 904E – Start and end year *Cross out if still there*	|___|___| |___|___| Start End	|___|___| |___|___| Start End	|___|___| |___|___| Start End	|___|___| |___|___| Start End	|___|___| |___|___| Start End
905 – District 2 (2nd District outside of place of birth). *In plain text and CAPITALS*	……	……	……	……	……
905S – 905E – Start and end year *Cross out if still there*	|___|___| |___|___| Start End	|___|___| |___|___| Start End	|___|___| |___|___| Start End	|___|___| |___|___| Start End	|___|___| |___|___| Start End
906 – District 3 (3rd District outside of place of birth) *In plain text and CAPITALS*	……	……	……	……	……
906S – 906E – Start and end year *Cross out if still there*	|___|___| |___|___| Start End	|___|___| |___|___| Start End	|___|___| |___|___| Start End	|___|___| |___|___| Start End	|___|___| |___|___| Start End
907 – District 4 (4th District outside of place of birth) *In plain text and CAPITALS*	……	……	……	……	……
907S – 907E – Start and end year *Cross out if still there*	|___|___| |___|___| Start End	|___|___| |___|___| Start End	|___|___| |___|___| Start End	|___|___| |___|___| Start End	|___|___| |___|___| Start End

- ***More migrants*** ➔ *additional sheets*
- ***MODULE CITIZENSHIP*** ➔ *Next page*

MODULE CITIZENSHIP

SEE GRID COLUMN 9

1200 – Count in GRID the number of periods during which ego had one or several nationalities: |___|___|

	Start and end years	**Nationalities held** *in CAPITAL letters*
1200S – 1200F– Nationality or nationalities by birth	|___|___| |___|___| Start End	**N : ……..** **N : ……..** **N : ……..** **N : ……..**
1201S – 1201F – 1st change *Cross out if no change*	|___|___| |___|___| Start End	**N : ……..** **N : ……..** **N : ……..** **N : ……..**
1202S – 1202F – 2nd change *Cross out if no change*	|___|___| |___|___| Start End	**N : ……..** **N : ……..** **N : ……..** **N : ……..**
1203S – 1203F – 3rd change *Cross out if no change*	|___|___| |___|___| Start End	**N : ……..** **N : ……..** **N : ……..** **N : ……..**

MODULE TRANSFERS SENT

SEE GRID COLUMN 6

1600 – Count in GRID the periods of REGULAR TRANSFERS SENT: |___|___| and fill in one column for each period

	1st period TRO	**2nd period TRO**	**3rd period TRO**	**4th period TRO**	**5th period TRO**
1601S – 1601E – Start and end years of transfers *Cross out if ongoing*	|___|___| |___|___| Start End	|___|___| |___|___| Start End	|___|___| |___|___| Start End	|___|___| |___|___| Start End	|___|___| |___|___| Start End
1601P – Destination countries of transfers *Note in plain text all countries*	....	....	....	....	....

MODULE TRANSFERS RECEIVED

SEE GRID COLUMN 7

1700 – Count in GRID the periods of REGULAR TRANSFERS RECEIVED: |___|___| and fill in one column for each period

	1st period TRI	2nd period TRI	3rd period TRI	4th period TRI	5th period TRI
1701S – 1701E – Start and end years of transfers *Cross out if ongoing*	|___|___| |___|___| Start End	|___|___| |___|___| Start End	|___|___| |___|___| Start End	|___|___| |___|___| Start End	|___|___| |___|___| Start End
1701P – Destination countries of transfers *Note in plain text all countries*	....	....	....	....	....

END – THANKYOU.